Health Care for the Homeless

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Bibliography #6

Tuberculosis Among Homeless People

January 2003

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2002

Geng, E, Kreiswirth, B, Driver, C, Li, J, Burzynski, J, DellaLatta, P, LaPaz, A, Schluger, N. **Changes in the transmission of tuberculosis in New York City from 1990-1999.** New England Journal of Medicine 346 (19): 1453-1458, 2002.

In this article, the authors discuss the importance of understanding the reasons for the lack of reduction among non-U.S.-born persons, in forming new strategies for tuberculosis control. The study examined was performed in northern Manhattan, between 1990 and 1999, and was designed to identify the strains responsible for multiple infections. Findings show that among foreign-born persons, tuberculosis is largely caused by reactivation of latent infection, whereas among U.S. born persons, many cases wee a result of recent transmission. The authors assert that strategies for the control and elimination of tuberculosis among foreign born people at high risk should be directed toward the treatment of latent tuberculosis infection (authors).

Weis, SE, Pogoda, JM, Yang, Z, Cave, MD, Wallace, C, Kelley, M, Barnes, PF. **Transmission dynamics of tuberculosis in Tarrant County, Texas.** American Journal of Respiratory and Critical Care Medicine 166 (1): 36-42, 2002.

This article explains the transmission dynamics of tuberculosis in an urban area where the prevalence of HIV infection is relatively low, and evaluates the utility of photograph recognition as a tool to establish epidemiological connections between patients with tuberculosis who are linked by recent disease transmission. The authors assert that the use of photograph recognition of other patients with tuberculosis, in combination with RFLP analysis, has the potential to enhance tuberculosis control by facilitating identification of local foci of disease transmission (authors)

Kong PM, Tapy J, Calixto P, Burman WJ, Reves RR, Yang Z, Cave MD. **Skin-test screening and tuberculosis transmission among the homeless.** Emerg Infect Dis 8(11): 1280 – 1284, Nov. 2002.

We describe the implementation of a mandatory tuberculosis (TB) screening program that uses symptom screening and tuberculin skin testing in homeless shelters. We used the results of DNA fingerprinting of Mycobacterium tuberculosis isolates to evaluate the effect of the program on TB incidence and transmission. After the program was implemented, the proportion of cases among homeless persons detected by screening activities increased, and the estimated TB incidence decreased from 510 to 121 cases per 100,000 population per year. Recent transmission, defined by DNA fingerprinting analysis as clustered patterns occurring within 2 years, decreased from 49% to 14%. Our results suggest that the shelter-based screening program decreased the incidence of TB by decreasing its transmission among the homeless.

Lathan M, Mukasa LN, Hooper N, Golub J, Baruch N, Mulcahy D, Benjamin W, Cronin WA. **Cross-jurisdictional transmission of mycobacterium tuberculosis in Maryland and Washington, D.C. 1996-2000, linked to the homeless.** Emerg Infect Dis Nov;8(11):1249-51,2002**.**

From 1996 to 2000, 23 Maryland and Washington, D.C., tuberculosis cases were identified in one six-band DNA cluster. Cases were clustered on the basis of their Mycobacterium tuberculosis isolates. Medical record reviews and interviews were conducted to identify epidemiologic linkages. Eighteen (78%) of the 23 case-patients with identical restriction fragment length polymorphism patterns were linked to another member; half the patients were associated with a Washington, D.C., homeless shelter. Molecular epidemiology defined the extent of this large, cross-jurisdictional outbreak.

Miller AC, Butler WR, McInnis B, Boutotte J, Etkind S, Sharnprapai S, Bernardo J, Driscoll J, McGarry M, Crawford JT, Nardell E. **Clonal relationships in a shelter-associated outbreak of drug-resistant tuberculosis: 1983-1997.** Int J Tuberc Lung Dis 2002 Oct;6(10):878.

SETTING: An outbreak of tuberculosis caused by Mycobacterium tuberculosis resistant to isoniazid and streptomycin (HS-resistant) was documented in Boston's homeless population in 1984. Isolate relatedness was confirmed at the time by phage typing. In the late 1990s, cases of HS-resistant tuberculosis in the homeless were also documented, confirmed by RFLP typing using IS6110. None of the phage typed isolates from the 1980s were viable for performing RFLP analysis. We attempted to determine, using mixed-linker PCR (M-L PCR) finger-printing, whether or not these cases were all due to the same strain of M. tuberculosis. DESIGN: Isolates from 10 HS-resistant patients-four non-viable isolates from the 1980s and six viable isolates from 1996-1997-were sent to the Centers for Disease Control and Prevention for M-L PCR fingerprinting. These results were combined with record reviews of older cases and an ongoing epidemiologic investigation. RESULTS: Eight of 10 of the isolates were clonal, and the other two were strongly suspected matches. Epidemiologic investigation determined that transmission continued to occur after the initial outbreak in 1984-1985, and that a streptomycin-monoresistant variant of the strain was also circulating. CONCLUSION: M-L PCR fingerprinting combined with epidemiology was able to document links between cases across 15 years.

2001

Brewer TF, Heyman SJ, Krumplitsch SM, Wilson ME, Colditz GA, Fineberg HV. **Strategies to decrease tuberculosis in U.S. homeless populations: A computer simulation model.** JAMA, 286(7):834-42, Aug 2001.

CONTEXT: The rate of tuberculosis (TB) among US homeless persons may be 20 times that of the general adult population. Studies suggest that the majority of urban homeless TB cases are attributable to ongoing transmission of TB. Optimal TB-control strategies in both chronically and transiently homeless populations are not known. OBJECTIVE: To examine the effects of TB-control strategies on projected TB cases and deaths in US homeless populations using a computer-based simulation model. DESIGN, SETTING, AND POPULATION: The US general population and a theoretical population of 2 million homeless individuals in 1995 were divided into 18 clinical states based on the risk for the presence of TB and human immunodeficiency virus (HIV) infected in a semi-Markov model. MAIN OUTCOME MEASURES: Prevalence of transiently and chronically homeless individuals with active TB and deaths from TB as a function of public health measures taken to control and eliminate TB, including improvement of treatment effectiveness, improvement of treatment effectiveness, improvement in access to treatment, and vaccination

with BCG. RESULTS: A 10% increase in access to treatment among homeless persons with active TB produced larger declines in predicted TB cases and deaths after 10 years (cases and deaths among chronically homeless persons decreased 12.5% and 19.8% and among transiently homeless persons dropped 35.9% and 32.4%, respectively) than improvements in the effectiveness of treatment programs (cases and deaths among chronically homeless persons declined 7.2% and 3.1% and among transiently homeless persons dropped 10.9% and 4.1%, respectively). A 10% increase in access to treatment among homeless persons with latent TB infection led to a 6.7% decline in TB among chronically homeless persons and a 5.7% decline among transiently homeless persons, while a 10% improvement in effectiveness of treatment for latent TB infection was associated with declines of 3.0% and 3.3%, respectively. When treatment for latent TB infection was modeled to be the same in vaccinated and non-vaccinated populations, BCG vaccination led to TB case declines of 15.4% and 21.5% in chronically and transiently homeless populations, respectively. CONCLUSIONS: Overcoming barriers faced by homeless individuals in accessing TB treatment programs will be crucial to reducing the burden of TB in the high-risk group. Increased treatment access, improvement in the effectiveness of treatment programs, and BCG vaccination of HIV-negative homeless individuals have the best chance to markedly decrease TB morbidity and mortality.

Colton, R.D., Colton, S.D. **An alternative to regulation in the control of occupational exposure to tuberculosis in homeless shelters.** New Solutions: A Journal of Environmental and Occupational Health Policy 11(4): 307-324, 2001.

The occupational risk of exposure to TB at homeless shelters is particularly acute. This article concludes that the risk of TB exposure within homeless shelter workers is best viewed as a public health problem rather than as exclusively a worker protection problem. The authors assert that, in addition to seeking worker protections through regulatory controls, the U.S. Occupational Safety and Health Administration (OSHA) should seek to promote occupational health and safety thought a public health response as well (authors).

Davila R. **TB up 25% in county – homeless found to be hardest hit.** Sacramento Bee, Sacramento, CA, March 16, 2001. (Newspaper Article:1 page)

This newspaper article appeared in the Sacramento Bee, Sacramento, California on March 16, 2001. It reveals that active tuberculosis cases are increasing in Sacramento County, especially among homeless people, accelerating a public health crisis that could take more than a decade to bring under control. Homeless people are at high risk because they sleep and congregate in group settings. In Sacramento, as more cases are discovered and contact investigation continues, it has come clear to top health officials that this outbreak will not be contained quickly. AVAILABLE FROM: Sacramento Bee archives, Sacramento, CA, March 16, 2001.

World Health Organization. **Tuberculosis (TB) and HIV linked, joint efforts needed.** Health Education Research 16(3): 2001.

The link between HIV and TB is inescapable. Joint efforts are needed to confront tuberculosis and HIV. TB is a leading killer of people living with HIV and it is highest in countries with the highest rates of HIV. TB and HIV are both enhanced by poverty, homelessness, substance abuse, psychological stress, poor nutritional status, and crowded living conditions. Effectively treating TB will not solve the world wide AIDS crisis, but it will significantly reduce its burden.

2000

Curtis AB, Ridzon R, Novick LF, Driscoll J, Blair D, Oxtoby M, McGarry M, Hiscox B, Faulkner C, Taber H, Valway S, Onorato IM. **Analysis of mycobacterium tuberculosis transmission patterns in a homeless shelter outbreak.** Int J Tuberc Lung Dis, 4(4):308-13, April 2000.

SETTING: From July 1997 through May 1998, ten tuberculosis (TB) cases were reported among men in a Syracuse New York homeless shelter for men. OBJECTIVE AND DESIGN: Investigation to determine extent of, and prevent further, transmission of Mycobacterium tuberculosis. RESULTS: Epidemiologic and laboratory evidence suggests that eight of the ten cases were related. Seven cases had isolates with matching six-band IS6110 DNA fingerprints; the isolate from another case had a closely related fingerprint pattern and this case was considered to be caused by a variant of the same strain. Isolates from eight cases had identical spoligotypes. The source case had extensive cavitary disease and stayed at the shelter nightly, while symptomatic, for almost 8 months before diagnosis. A contact investigation was conducted among 257 shelter users and staff, 70% of whom had a positive tuberculin skin test, including 21 with documented skin test conversions. CONCLUSIONS: An outbreak of related TB cases in a high-risk setting was confirmed through the use of IS6110 DNA fingerprinting in conjunction with spoligotyping and epidemiologic evidence. Because of the high rate of infection in the homeless population, routine screening for TB and preventive therapy for eligible persons should be considered in shelters.

Falchook G, Gaffga C, Eve S, Ali J. **Tuberculosis screening, referral, and treatment in an inner city homeless shelter in Orleans Parish**. J LA State Med Society, 152(8)398-404, Aug 2000.

Tuberculosis screening and preventive therapy among the homeless has been a challenge because of the lack of coordinated follow-up. Homeless persons at a homeless shelter in inner city New Orleans were screened for tuberculosis infection and referred for follow-up evaluation and preventive therapy. Fifty-two percent of the 104 persons screened completed the initial evaluation. Twenty-two percent of these patients had latent tuberculosis infection. Forty-two percent of infected patients completed the referral and follow-up process. Patients during the second 3 months of the program were twice as likely to complete the initial evaluation, the referral, and the follow-up process as were patients during the first 3 months due to enhanced awareness and increased educational intervention. A competent referral system for homeless persons may be achieved by implementing a single-clinic, on-site tuberculosis screening and follow-up system with the active participation and coordination of state agencies, the medical community, and organizations which operate homeless facilities.

Gelberg L, Andersen RM, Leake BD. **The Behavioral Model for Vulnerable Populations: Application to medical care use and outcomes for homeless people.** Health Serv Res, 34(6):1273-302, Feb 2000. Comment in: Health Serv Res, 34(6):1303-5, Feb 2000.

OBJECTIVES: (1) To present the Behavioral Model for Vulnerable Populations, a major revision of a leading model of access to care that is particularly applicable to vulnerable populations; and (2) to test the model in a prospective study designed to define and determine predictors of the course of health services utilization and physical health outcomes within one vulnerable population: homeless adults. We paid particular attention to the effects of mental health, substance use, residential history, competing needs, and victimization. METHODS: A community-based probability sample of 363 homeless individuals was interviewed and

examined for four study conditions (high blood pressure, functional vision impairment, skin/leg/foot problems, and tuberculosis skin test positivity). Persons with at least one study condition were followed longitudinally for up to eight months. PRINCIPAL FINDINGS: Homeless adults had high rates of functional vision impairment (37 percent), skin/leg/foot problems (36 percent), and TB skin test positivity (31 percent), but a rate of high blood pressure similar to that of the general population (14 percent). Utilization was high for high blood pressure (81 percent) and TB skin test positivity (78 percent), but lower for vision impairment (33 percent) and skin/leg/foot problems (44 percent). Health status for high blood pressure, vision impairment, and skin/leg/foot problems improved over time. In general, more severe homeless status, mental health problems, and substance abuse did not deter homeless individuals from obtaining care. Better health outcomes were predicted by a variety of variables, most notably having a community clinic or private physician as a regular source of care. Generally, use of currently available services did not affect health outcomes. CONCLUSIONS: Homeless persons are willing to obtain care if they believe it is important. Our findings suggest that case identification and referral for physical health care can be successfully accomplished among homeless persons and can occur concurrently with successful efforts to help them find permanent housing, alleviate their mental illness, and abstain from substance abuse.

Jerant AF, Bannon M, Rittenhouse S. **Identification and management of tuberculosis.** Am Fam Physician, 61(9):2667-78, 2681-2, May 1 2000.

Although the resurgence of tuberculosis in the early 1990s has largely been controlled, the risk of contracting the disease remains high in homeless persons, recent immigrants and persons infected with the human immunodeficiency virus (HIV). Purified protein derivative testing should be targeted at these groups and at persons with known or suspected exposure to active tuberculosis. Most patients with latent tuberculosis are treated with isoniazid administered daily for nine months. In patients with active tuberculosis, the initial regimen should include four drugs for at least two months, with subsequent therapy determined by mycobacterial sensitivities and clinical response. To avoid harmful drug interactions, regimens that do not contain rifampin may be employed in HIV-infected patients who are taking protease inhibitors or nonucleoside reverse transcriptase inhibitors. To maximize compliance and minimize the emergence of mycobacterial drug resistance, family physicians should consider using directly observed therapy in all patients with tuberculosis.

Kearns AM, Barrett A, Marshall C, Freeman R, Magee JG, Bourke SJ, Steward M. **Epidemiology and molecular typing of an outbreak of tuberculosis in a hostel for homeless men.** J Clin Pathol, 53(2):122-4, Feb 2000.

AIM: To investigate a possible outbreak of tuberculosis in a hostel for homeless men using IS6110 profiling, a polymerase chain reaction (PCR) based fingerprinting technique. METHODS: Eight cases of tuberculosis were diagnosed in residents of the hostel over a period of 28 months. To provide epidemiological data, a heminested inverse PCR (HIP) assay targeting the insertion sequence IS6110 together with its upstream flanking region was used to fingerprint the eight isolates of M tuberculosis under investigation. RESULTS: The HIP technique gave IS6110 profiles which showed that while three isolates were clearly distinct, the remaining five strains were indistinguishable, suggesting the latter were representatives of a single outbreak strain. CONCLUSIONS: The HIP assay proved discriminatory and facilitated repeated testing for the direct comparison of strains as more patients presented over the protracted course of this outbreak.

Marks SM, Taylor Z, Burrows NR, Qayad MG, Miller B. **Hospitalization of homeless persons with tuberculosis in the United States.** Am J Public Health, 90(3):435-8, March 2000.

OBJECTIVES: This study assessed whether homeless patients are hospitalized for tuberculosis (TB) more frequently and longer than other patients and possible reasons for this. METHODS: We prospectively studied hospitalizations of a cohort of TB patients. RESULTS: HIV-infected homeless patients were hospitalized more frequently than other patients, while homeless patients who had no insurance or whose insurance status was unknown were hospitalized longer. Hospitalization cost $2000 more per homeless patient than for other patients. The public sector paid nearly all costs. CONCLUSIONS: Homeless people may be hospitalized less if given access to medical care that provides early detection and treatment of TB infection and disease and HIV infection. Providing housing and social services may also reduce hospital utilization and increase therapy completion rates.

Moss AR, Hahn JA, Tulsky JP, Daley CL, Small PM, Hopewell PC. **Tuberculosis in the homeless. A prospective study**. Am J Respiratory & Critical Care, 162(2 Pt 1):460-4, Aug 2000.

We set out to determine tuberculosis incidence and risk factors in the homeless population in San Francisco. We also examined the transmission of tuberculosis by molecular methods. We followed a cohort of 2,774 of the homeless first seen between 1990 and 1994. There were 25 incident cases during the period 1992 to 1996, or 270 per 100,000 per year. Ten cases were persons with seropositive HIV. Independent risk factors for tuberculosis were HIV infection. African American or other nonwhite ethnicity, positive tuberculin skin test (TST) results, age, and education; 60% of the cases had clustered patterns of restriction fragment length polymorphism, thought to represent recent transmission of infection with rapid progression to disease. Seventy-seven percent of African-American cases were clustered, and 88% of HIV-seropositive cases. The high rate of tuberculosis in the homeless was due to recent transmission in those HIV-positive and nonwhite. African Americans and other nonwhites may be at high risk for infection or rapid progression. Control measures in the homeless should include directly observed therapy and incentive approaches, treatment of latent tuberculous infection in those HIV-seropositive, and screening in hotels and shelters.

Murphy, D.A., Rotheram-Borus, M.J., Joshi, V. **HIV-infected adolescent and adult perceptions of tuberculosis testing, knowledge and medication adherence in the USA.** Aids Care Journal 12(1): 59-63, 2000.

HIV-infected adolescent and adult perceptions of tuberculosis (TB) infection rates and physician TB behavior, and patient knowledge of TB transmission and treatment adherence were assessed. HIV-infected youth(N=199) from adolescent clinical care sites in three cities and HIV-infected adults (N=133) in New York were interviewed. Adolescent self-report was compared to medical chart review. Adolescents reported they were significantly less likely to be tested, although testing rates were high for both samples. Approximately 9% of both samples reported infection with TB; the majority of whom reported receiving medication (97%), and consistent medication adherence (93%). The overall mean knowledge score was 66%, with significant age differences: adolescents were less knowledgeable than adults, and young males tended to be less knowledgeable than young females. Age, gender and experience with TB (self-perception of TB, testing history and clinic choice) significantly predicted accuracy of knowledge about TB. Results suggest that if HIV-infected individuals--a population at very high risk and often among the least able to afford health care resources--receive the education and support they need from their community health care sources they may substantially reduce their chances of contracting and spreading TB. (authors).

Poss JE. **Factors associated with participation by Mexican migrant farm workers in a tuberculosis**

screening program. Nursing research, 49(1):20-8, 2000.

BACKGROUND: Tuberculosis is an important public health concern among migrant farm workers in the United States; providing appropriate screening and treatment is difficult due to their highly mobile existence. PURPOSE: To analyze the relationship between variables (susceptibility, severity, barriers, benefits, cues to action, normative beliefs, subjective norm, attitude, and intention) from the Health Belief Model (HBM) and the Theory of Reasoned Action (TRA) and participation by Mexican migrant farm workers in a tuberculosis screening program. METHOD: A convenience sample of 206 migrant farm workers were recruited after a presentation of a tuberculosis education program and were tracked during the administration and reading of the tuberculosis skin test. Participants were interviewed in Spanish by the principal investigator using the Tuberculosis Interview Instrument (TII) developed for this study. RESULTS: Most subjects were male aged 18-27 years, and had less than a sixth-grade education. Of the 206 subjects, 152 (73.4%) received the skin test, 149 (98%) had the skin test read, and 44 (29.5%) had positive skin tests. Based on logistic regression analysis, the model that best predicted intention included cues to action, subjective norm, susceptibility, and attitude. Participation in screening was best predicted by a model containing only two variables: intention and susceptibility. CONCLUSIONS: In this study, logistic regression analysis revealed that a more parsimonious model than the full HBM and TRA model accurately predicted both intention and behavior. The findings may be helpful in developing tuberculosis education and screening programs for Mexican migrant farm workers.

Rayner D. **Reducing the spread of tuberculosis in the homeless population.** Br J Nurs, 9(13):871-5, July 13-26, 2000.

Tuberculosis (TB) is an old infectious disease that has re-emerged in recent years and is responsible for many deaths throughout the world. Homeless people residing in shelters and hostels within inner city areas of the UK and the USA are at risk from this serious disease. Interventions to control the spread of TB are described in the literature researched; these include the introduction of inducements to encourage participation in screening programmes and the recommendation of directly observed therapy. The literature reflects the partial success of these programmes in the UK and USA. Targeting homeless persons most at risk is challenging as is gaining accurate information on those who are affected by TB. Effective coordination of care by healthcare providers in hospital and the community is imperative. It appears that healthcare professionals are becoming more prescriptive in their approach, which is relinquishing the homeless population from taking responsibility for their own health care.

Tulsky JP, Pilote L, Hahn JA, Zolopa AJ, Burke M, Chesney M, Moss AR. **Adherence to isoniazid prophylaxis in the homeless: a randomized controlled trial.** Arch Intern Med, 160(5):697-702, March 13, 2000.

OBJECTIVES: To test 2 interventions to improve adherence to isoniazid preventive therapy for tuberculosis in homeless adults. We compared (1) biweekly directly observed preventive therapy using a $5 monetary incentive and (2) biweekly directly observed preventive therapy using a peer health adviser, with (3) usual care at the tuberculosis clinic. METHODS: Randomized controlled trial in tuberculosis-infected homeless adults. Outcomes were completion of 6 months of isoniazid treatment and number of months of isoniazid dispensed. RESULTS: A total of 118 subjects were randomized to the 3 arms of the study. Completion in the monetary incentive arm was significantly better than in the peer health adviser arm and the usual care arm, by log-rank test. Overall, 19 subjects (44%) in the monetary incentive arm completed preventive therapy compared with 7 (19%) in the peer health adviser arm and 10 (26%) in the usual care arm. The median number of months of isoniazid dispensed was 5 in the monetary incentive arm vs 2 months in the peer health adviser arm and 2 months in the usual care arm. In multivariate analysis, independent predictors of

completion were being in the monetary incentive arm and residence in a hotel or other stable housing at entry into the study vs residence on the street or in a shelter at entry. CONCLUSIONS: A $5 biweekly cash incentive improved adherence to tuberculosis preventive therapy compared with a peer intervention or usual care. Living in a hotel or apartment at the start of treatment also predicted the completion of therapy.

1999

Bock NN, Metzger BS, Tapia JR, Blumberg HM. **A tuberculin screening and isoniazid preventive therapy program in an inner-city population.** Am J Respir Crit Care Med, 159(1):295-300, Jan 1999.

As tuberculosis transmission decreases, case rates decline and an increasing proportion of cases arises from the pool of persons with latent infection. Elimination of TB will require preventing disease from developing in infected persons. From 1994 to 1996 the Atlanta TB Prevention Coalition conducted a community-based TB screening and isoniazid preventive therapy project among high-risk inner-city residents of Atlanta, Georgia. We established screening centers in outpatient waiting areas of the public hospital serving inner-city residents, the city jail, clinics serving the homeless, and with outreach teams in neighborhoods frequented by drug users. All services were provided free. A total of 7,246 persons participated in TB testing; 4,701 (65%) adhered with skin test reading, 809 (17%) had a positive test, 409 (50%) fit current guidelines for isoniazid preventive therapy, 84 (20%) we intended to treat completed therapy. The major limitations of this community-based TB screening and preventive therapy project were the low proportion of infected individuals who were eligible for isoniazid preventive therapy and the poor adherence with a complete regimen among those we intended to treat. For community-based programs to be efficacious, preventive therapy regimens that are of shorter duration and safe for older persons will need to be implemented.

Gasner MR, Maw KL, Feldman GE, Fujiwara PI, Frieden TR. **The use of legal action in New York City to ensure treatment of tuberculosis.** N Engl J Med, 340(5):359-66, February 4, 1999. Comment in: N Engl J Med, 341(2):130; discussion 130-1, July 8, 1999.

BACKGROUND AND METHODS: After an increase in the number of cases of tuberculosis, New York City passed regulations to address the problem of nonadherence to treatment regimens. The commissioner of health can issue orders compelling a person to be examined for tuberculosis, to complete treatment, to receive treatment under direct observation, or to be detained for treatment. On the basis of a review of patients' records, we evaluated the use of these legal actions between April 1993 and April 1995. RESULTS: Among more than 8000 patients with tuberculosis, regulatory orders were issued for less than 4 percent. Among patients with a variety of social problems, only a minority required regulatory intervention: 10 percent of those with injection-drug use, 16 percent of those with alcohol abuse, 17 percent of those who were homeless, 29 percent of those who used "crack" cocaine, and 38 percent of those with a history of incarceration. A total of 150 patients were ordered to undergo directly observed therapy, 139 patients to be detained during therapy, 12 patients to be examined for tuberculosis, and 3 patients to complete treatment. These 304 patients had a median of three prior hospitalizations related to tuberculosis and one episode of leaving the hospital against medical advice. Repeatedly noncompliant patients and those who left the hospital against medical advice were more likely than others to be detained. The median length of detention was 3 weeks for infectious patients and 28 weeks for noninfectious patients. As compared with patients ordered to receive directly observed therapy, the patients who were detained remained infectious longer, had left hospitals against medical advice more often, and were less likely to accept directly observed therapy voluntarily. Altogether, excluding those who died or moved, 96 percent of the patients completed treatment, and 2 percent continued to receive treatment for multidrug-resistant tuberculosis. CONCLUSIONS: For most patients with tuberculosis, even those with

severe social problems, completion of treatment can usually be achieved without regulatory intervention. Patients were detained on the basis of their history of tuberculosis, rather than on the basis of their social characteristics, and the less restrictive measure of mandatory directly observed therapy was often effective.

Griffin RG, Hoff GL. **Tuberculosis screening in Kansas City homeless shelters.** Mo Med, 96(10):496-9, Oct 1999.

Voluntary tuberculin skin testing, coupled with on-site radiographic examination of persons with indurations > or = 10 mm, was conducted in five home-less shelters in Kansas City. Of 856 skin tests administered, 654 were read and 89 (13.6%) were positive. Males were nearly four times as likely to have a positive skin test than females. None of the positive individuals had abnormal chest radiographs. Of 42 persons who initiated preventive therapy, only eight completed the course of treatment.

Health Care for the Homeless Clinician's Network. **Healing Hands.** HCH Clinician's Network, Healing Hands, 3(1): Jan 1999.

This issue of the Clinicians- Network newsletter focuses on the problem of tuberculosis among homeless people. Articles include: (1) TB as a reflection of society's concern, or lack of concern, for its most vulnerable citizens; (2) how to combat TB in homeless shelters; (3) best practices for HCH projects; and (4) an OSHA standards update. AVAILABLE FROM: HCH Clinician's Network, PO Box 68019, Nashville, TN 37206-8019.

Homeless Health Care Los Angeles **Tuberculosis prevention guide for homeless service providers. Fourth edition.** Los Angeles, CA: Homeless Health Care Los Angeles, Nov 1999-2000.

This comprehensive guide includes the latest TB information for providers of services to the homeless population. It is especially useful for directors, administrators, disease control managers and front line staff of homeless shelters, clinics, mental health facilities, drug treatment programs and governmental agencies. An easy-to-implement curriculum allows providers to incorporate basic disease prevention practices into their work with clients. Administrators will benefit from sample agency policies and model TB programs that can be easily adapted to meet the particular needs of different agencies and communities. AVAILABLE FROM: Homeless Health Care Los Angeles, 1010 S. Flower St., Suite 500, Los Angeles, CA 90015. (213) 744-0724. Attn: Director of Training and Education. COST: $10.00 ($5.00 for five or more).

Ijaz K, Bates JH. **Tuberculosis rises in homeless shelters.** J Ark Med Soc, 96(3):101, 103, Aug 1999.

Kimerling ME, Shakes CF, Carlisle R, Lok KH, Benjamin WH, Dunlap NE. **Spot sputum screening: Evaluation of an intervention in two homeless shelters.** Int J Tuberc Lung Dis, 3(7):613-9, July 1999.

SETTING: Two homeless shelters in Birmingham, Alabama. OBJECTIVE: To interrupt tuberculosis transmission and evaluate the utility of spot sputum screening. DESIGN: Two shelters participated in the study between May 1996 and February 1997. A spot sputum specimen was collected on a given evening from each overnight client. Information was obtained regarding symptoms and tuberculin skin test (TST) status. There were four screenings during two rounds, with TST in round one only. RESULTS: Of 127 persons involved in the study, 120 (95%) provided specimens, and four tuberculosis cases were identified (4/127,

3.1%). Symptoms were infrequently reported. RFLP analysis (IS6110) confirmed a two-band cluster in three of the four cases; another matching two-band strain was found in a drug rehabilitation client staying in one shelter. Secondary RFLP typing (pTBN12) confirmed the homeless cluster. Costs were $1311 per case identified. Among 92 clients with a prior TST, 40% reported a positive result (37/92). Of 21 PPD tests read, 11 were > or =10 mm (52%). CONCLUSION: Spot sputum screening is effective in identifying unsuspected tuberculosis cases in shelters. It has acceptable costs, is logistically simple and efficient. Symptom screening was not useful in this general homeless population. RFLP analysis showed cloning of the two-band strain. Given the evidence for ongoing transmission, sputum screening should be considered in shelter settings.

LoBue PA, Cass R, Lobo D, Moser K, Catanzaro A. **Development of housing programs to aid in the treatment of tuberculosis in homeless individuals: A pilot study**. Chest, 115(1):218-23, Jan 1999.

STUDY OBJECTIVES: To describe our experience with novel supervised housing programs developed to aid in the treatment of tuberculosis (TB) in homeless individuals, including a preliminary analysis of their effectiveness and estimate of potential cost savings. DESIGN: Retrospective chart review. SETTING: A county TB control program. METHODS: The San Diego County TB Control Program's computer database was used to identify homeless individuals placed in one of two supervised housing programs for treatment of TB [Young Men's Christian Association (YMCA), for noninfectious patients, or Bissell House, for infectious patients]. Charts for all these patients were reviewed and information regarding their demographics, underlying medical conditions, therapy, microbiologic markers of response to therapy, hospitalizations, and participation in supervised housing programs was recorded. MEASUREMENTS AND RESULTS: The sputum culture conversion and treatment completion rates for those housed in the YMCA were 100 and 84.6%, respectively. Of the patients in the Bissell House program, 100% had converted their smear and culture. In addition, all patients in this program completed an adequate course of supervised therapy. These rates of microbiologic conversion and treatment completion compare favorably with historical data from San Diego County and other locations. Estimated cost savings for placing medically stable infectious patients in the Bissell House for respiratory isolation and supervised treatment were estimated to be $27,034 per patient. CONCLUSIONS: Use of supervised housing to aid treatment of TB in the homeless appears to be effective and results in substantial cost savings. A larger multicenter study should be considered to confirm these findings and better quantify the cost-effectiveness of such programs.

Mehta JB, Roy TM, Hughes SK, Byrd Jr. RP, Harvill LM. **Demographic changes in tuberculosis: High risk groups.** South Med J, 92(3):280-4, 1999.

We conducted a statistical analysis of all verifiable (TB) cases in Tennessee from 1990 through 1996 to determine the demographic changes in TB. We studied variables, including age, sex, race, site of the disease, and possible impact of known risk factors such as human immunodeficiency virus (HIV) infection, homelessness, foreign birth, and residency in extended care facility. The percentage increase in all such categories, except in the nursing home population, was statistically significant Unlike national epidemiologic findings, foreign-born TB comprised less than 1% of the total cases. Association of HIV as a co-infection increased from 16 (2.7%) in 1990 to 41 (8.1%) in 1996. These findings will have significant impact on TB control measures and the clinical practice of TB cases in Tennessee and other areas of the southeastern US.

Peterson Tulsky J, Castle White M, Young JA, Meakin R, Moss AR. **Street talk: Knowledge and attitudes about tuberculosis and tuberculosis control among homeless adults.** Int J Tuberc Lung Dis, 3(6):528-33, June 1999.

OBJECTIVES: To measure knowledge and perceived susceptibility to tuberculosis among homeless adults in San Francisco and attitudes toward control measures used to improve adherence to treatment for tuberculosis. DESIGN: A cross-sectional survey via interview of homeless shelter residents was done at five shelters. RESULTS: Of 292 persons interviewed, 21.6% reported a positive skin test, and 57.1% of the positives had received preventive therapy. Over 60% had misconceptions about transmission, in particular confusion with transmission of the human immunodeficiency virus (HIV). Knowledge of skin testing procedures and symptoms was generally good, and most reported health care providers as the main source of information. Over half reported concern about catching tuberculosis and over 80% favored controls to ensure adherence, in particular directly observed therapy. Higher TB knowledge score and male sex were associated with a favorable attitude toward directly observed therapy. CONCLUSIONS: Health care providers should expand educational messages beyond skin testing. Greater knowledge about tuberculosis may increase acceptance of control measures. Targeted education plus social norms favoring completion of therapy may improve screening and treatment outcomes in this population.

Rendleman NJ. **Mandated tuberculosis screening in a community of homeless people.** Am J Prev Med, 17(2):108-13, Aug 1999.

BACKGROUND: To examine the effects of a community program on tuberculosis incidence, prevalence, and transmission requiring users of public facilities to carry cards certifying their compliance with a tuberculosis screening, prophylaxis, and treatment program. Community knowledge of tuberculosis and costs and benefits of the program are described. SETTING: A West Coast "skid row" community with historically high rates of tuberculosis, homelessness, poverty, and use of drugs and alcohol. DESIGN: Analysis of tuberculosis activity in communities in Oregon using Oregon Health Division Tuberculosis Data Bank data. Description of community response and cost considerations. MAIN OUTCOME MEASURES: Rates of active disease, mortality, and skin-test response. Compliance with card use and understanding of tuberculosis control measures. Program expenditures. RESULTS: An 89% drop in active disease in the highest-risk community in Oregon occurred over the first 10 years of the program. Compliance with the program permitting the use of public facilities, based on cooperation with skin testing, radiology, sputum collection, and therapy has been between 33% of converters completing prophylaxis in the worst year to 100% of active cases completing 4-drug therapy in the best. Facilities that provide services have been almost universal in requiring cooperation for participants. Costs have been reduced. CONCLUSION: A program of mandated compliance with tuberculosis skin testing, radiologic and sputum examination and treatment, coupled with education and outreach, succeeded in drastically reducing active tuberculosis, transmission, deaths, and cost in a homeless community.

Turner C, Chambers M. **Housing for infectious TB patients who are homeless: An alternative housing program.** Continuum, 19(2):17-8, March-April 1999.

1998

Asch S, Leake B, Knowles L, Gelberg L. **Tuberculosis in homeless patients: Potential for case finding in public emergency departments.** Ann Emerg Med, 32(2):144-7, Aug 1998.

STUDY OBJECTIVES: Previous studies have had difficulty evaluating the optimal clinical site for screening homeless patients for active TB. We hypothesized that homeless patients with TB would not frequently reside in shelters at the time of their diagnosis and would be more likely than other patients with TB to seek care in public hospitals, thus presenting an opportunity for screening radiography. METHODS: This registry-based survey included 743 consecutive patients with confirmed active TB in Los Angeles County. No therapeutic intervention was involved. RESULTS: When compared with patients with TB who were not homeless, homeless patients with TB were more likely to be male (93% vs 63%), black (44% vs 15%), living in the inner city (55% vs 7%), and born in the United States (67% vs 32%). They were more infectious than other patients with TB as evidenced by a trend toward more cavitary radiographic lesions (24% vs 16%) and significantly more positive sputum smears (56% vs 41%). Less than a third lived in congregate facilities such as shelters at the time of their diagnosis. Instead, their disease was diagnosed more often at county hospitals (54% vs 23%) than patients with TB who were not homeless. CONCLUSION: Widespread screening for TB in shelters may miss most homeless patients with TB. Because most county hospital homeless patients with TB initially present to emergency departments and many do not live in shelters, future cost-effectiveness studies should evaluate chest radiograph screening for all homeless ED patients.

Bock NN, McGowan JE Jr, Blumberg HM. **Few opportunities found for tuberculosis prevention among the urban poor.** Int J Tuberc Lung Dis, 2(2):124-9, Feb 1998.

SETTING: Grady Memorial Hospital, a public hospital in Atlanta, Georgia, a city with high rates of tuberculosis. OBJECTIVE: To identify specific points of contact with the public health system where high risk individuals could receive tuberculin testing and isoniazid preventive therapy. DESIGN: Patient interviews and medical chart reviews of tuberculosis patients diagnosed in hospital between October 1993 and December 1994. RESULTS: In total 151 tuberculosis patients participated: 80% were male, 89% African American, the mean age was 40; 50% were HIV co-infected. Three fourths reported no regular source of medical care. The only potential public health sites at least one third of the patients had encountered in the five years prior to tuberculosis diagnosis were correctional institutions (44%) and public hospital in-patient wards (37%). Duration of incarceration was six months or more in only 13% of patients. Of 108 (71%) patients who had identified substance abuse problems, only 25% had been in treatment programs. CONCLUSION: We conclude that most tuberculosis cases in this community occurred in persons with poor access to health care and few opportunities for public health intervention. Tuberculosis prevention for this high risk population can best be accomplished by focusing efforts on early case identification, completion of therapy and contact investigations.

Centers for Disease Control and Prevention, Div. of Tuberculosis Elimination. **Reported tuberculosis in the United States, 1997.** CDC, Div. of Tuberculosis Elimination, July 1998.

This publication presents summary data for TB cases reported to DTBE during 1997 and contains five major sections: (1) overall TB case counts and case rates with selected demographic characteristics are presented for the 50 states, New York City, and the District of Columbia; (2) TB case counts and case rates are presented by state with tables of selected demographic and clinical characteristics; (3) data collected as part of the expanded system (e.g., initial drug resistance, HIV status) are presented by reporting area; (4) TB case counts and case rates are reported by metropolitan statistical area with tables of selected demographic and clinical

characteristics; (5) a collection of figures, including some data not presented in tabular format is presented.AVAILABLE FROM: Information Technology and Services Office, National Center for HIV, STD, and TB Prevention, CDC, Mailstop E-08, Atlanta, GA 30333

Grant PS. **Evaluation of infection control parameters according to the 1994 Centers for Disease Control and Prevention Tuberculosis guidelines: A 2-year experience**. Am J Infect Control, 26(3):224-31, June 1998.

BACKGROUND: Because of classification as a high-risk institution for potential Mycobacterium tuberculosis exposure and an employee purified protein derivative conversion rate of 2.7%, a large university-affiliated county hospital enhanced administrative and engineering controls, as recommended by its tuberculosis task force in early 1994. METHODS: For 1994 and 1995 the medical records of all patients with culture-confirmed M. tuberculosis were reviewed according to the 1994 Centers for Disease Control and Prevention guidelines for case surveillance and risk assessment (infection control parameters). RESULTS: In 1994 and 1995 there were 253 patients with tuberculosis, 85% of whom (214/253) had pulmonary-site tuberculosis. The "representative" patient with pulmonary tuberculosis was profiled, along with institution-specific surveillance data on diagnostics, medication regimens, and airborne isolation practices. Between 1994 and 1995 there was a trend toward increased numbers of homeless patients with tuberculosis, from 8.2% to 17%. Decreases in the numbers of HIV seropositive patients with tuberculosis from 35% in 1994 to 24% in 1995 and of jailed patients with tuberculosis from 9.8% to 5% were not significant. Drug-resistance patterns increased from 13% to 24%, with borderline significance. The employee purified protein derivative testing compliance rate increased from 49% in 1994 to 74% in 1995, with the purified protein derivative conversion rate also increasing from 2.7% to 3.5%. CONCLUSION: The infection control parameter data were beneficial in identification of institution-specific risk factors for our population with tuberculosis. Although labor-intensive, the annual tuberculosis reports supported requests for administrative and engineering controls; however, efficacy of the 1994 tuberculosis control plan was difficult to assess from purified protein derivative conversion rates alone, because the testing compliance rate also increased.

Lemaitre N, Sougakoff W, Truffot-Pernot C, Cambau E, Derenne JP,ricaire F, Grosset J, Jarlier V. **Use of DNA fingerprinting for primary surveillance of nosocomial tuberculosis in a large urban hospital: Detection of outbreaks in homeless people and migrant workers.** Int J Tuberc Lung Dis, 2(5):390-6, 1998.

SETTING: A large urban teaching hospital in the southeast of Paris. OBJECTIVE: Primary surveillance of nosocomial transmission of tuberculosis (TB) by systematic restriction fragment length polymorphism analysis (RFLP) of isolates (n=161) recovered from smear-positive pulmonary TB patients identified from 1 March 1993 to 28 February 1994, and from all TB patients (with any form of tuberculous infection) identified from 1 March 1994 to 30 April 1995. RESULTS: Systematic RFLP analysis revealed 12 clusters of patients (n=40) infected by strains of Mycobacterium tuberculosis showing matching RFLP patterns. None of the isolates were multidrug-resistant. Compared with non-clustered patients, clustered patients were more likely to be homeless (55% vs 19%, or Africans living in hostels for migrant workers (20% vs 6%, and had fewer previous admissions to hospital (12% vs 28%. Further epidemiological investigations showed that the clustered TB cases actually resulted not from nosocomial transmission, but from transmission in the community, very likely in homeless shelters and hostels for migrant workers. CONCLUSION: No nosocomial transmission of TB was identified among the patients included during the study period. Systematic RFLP analysis using hospital-based sampling can detect the spread of TB in specific environments in the community where transmission is occurring.

Malotte C K, Rhodes F, and Mais K **Tuberculosis screening and compliance with return for skin test**

reading among active drug users. Am J of Public Health, 88(5): 792-6, May 1998.

OBJECTIVES: This study assessed the independent and combined effects of different levels of monetary incentives and a theory-based educational intervention on return for tuberculosis (TB) skin test reading in a sample of active injection drug and crack cocaine users. Prevalence of TB infection in this sample was also determined. METHODS: Active or recent drug users (n=1004), recruited via street outreach techniques, were skin tested for TB. They were randomly assigned to one of two levels of monetary incentive ($5 and $10) provided at return for skin test reading, alone or in combination with a brief motivational educational session. RESULTS: More that 90% of those who received $10 returned for skin test reading, in comparison with 85% of those who received $5 and 33% of those who received no monetary incentive. The education session had no impact on return for skin test reading. The prevalence of a positive tuberculin test was 18.3%. CONCLUSIONS: Monetary incentives dramatically increase the return rate for TB skin test reading among drug users who are at high risk of TB infection.

McKenna M, McCray E, Jones J, Onorato I, Castro K. **The fall after the rise: Tuberculosis in the United States, 1991 through 1994**. Amer J Publ Health, 88(7):1059-63, July 1998.

OBJECTIVES: Factors associated with decreases in tuberculosis (TB) cases observed in the United States in 1993 and 1994 were analyzed. METHODS: Changes in case counts reported to the national surveillance system were evaluated by dividing the number of incident cases of TB reported in 1993 and 1994 by the number of cases reported in 1991 and 1992. And stratifying these ratios by demographic factors, AIDS incidence, and changes in program performance. RESULTS: Case counts decreased from 52, 956 in 1991 and 1992 to 49,605 in 1993 and 1994. The decrease, confined to US-born patients, was generally associated with AIDS incidence and improvements in completion of therapy, conversion of sputum, and increases in the number of contacts identified per case. CONCLUSIONS: Recent TB epidemiology patterns suggest that improvements in treatment patterns suggest that improvements in treatments and control activities have contributed to the reversal in the resurgence of this disease in US-born persons. Continued success in preventing the occurrence of active TB will require sustained efforts to ensure appropriate treatment of cases.

National Health Care for the Homeless Council. **Statement on OSHA'S proposed standard on occupational exposure to tuberculosis**. Nashville, TN: National Health Care for the Homeless Council, 1998.

This statement is in response to OSHA's proposed Standard on Occupational Exposure to Tuberculosis, published in the October 17, 1997 Federal Register. The National HCH Council urges that the proposed Standard not apply to homeless shelters as it is not feasible either economically or operationally and it lacks clear definition of the entities to which it would apply. The Council recommends that OSHA develop a separate proposal directed specifically at tuberculosis exposure in homeless settings. AVAILABLE FROM: National HCH Council, PO Box 60427, Nashville, TN 37206-0427. Phone: (615) 226-2292. Fax: (615) 226-1656.

Sakai J, Kim M, Shore J, Hepfer M. **The risk of purified protein derivative positivity in homeless men with psychotic symptoms.** South Med J, 91(4):345-8, April 1998.

BACKGROUND: Homeless people with mental illness have relatively high rates of human immunodeficiency virus, comorbid antisocial personality disorder, and may be homeless more frequently and for greater lengths of time. All of these factors may increase the risk of tuberculosis. METHODS: Our study was done to ascertain if homeless men with psychotic disorders are at an increased risk for tuberculosis infection. One hundred fifty homeless men were interviewed and given purified protein derivatives (PPDs) at a downtown shelter in New Orleans, Louisiana, during a three-month period. RESULTS: The findings show a strong relationship between psychotic disorders and positive PPDs, with a relative risk of 4.48. CONCLUSIONS: Homelessness and mental illness present barriers to seeking and completing treatment for medical illnesses such as tuberculosis. Use of services may be low even when available; therefore, homeless men with psychotic disorders may be serving as a reservoir for tuberculosis.

Smirnoff M, Goldberg R, Indyk L, Adler JJ. **Directly observed therapy in an inner city hospital**. Int J Tuberc Lung Dis, 2(2):134-9, Feb 1998. Comment in: Int J Tuberc Lung Dis, 2(2):95, Feb 1998.

SETTING: A directly observed therapy (DOT) tuberculosis (TB) program in a large urban teaching hospital in the East Harlem section of New York City. OBJECTIVE: In response to an emergent epidemic of TB, the State Department of Health mobilized a coalition of providers outside the public sector to provide DOT and medical care for people with TB, with the goal of treatment until cure. The results of the first 150 patients of one program are reviewed. DESIGN: A multidisciplinary DOT team coordinated treatment at several sites within and without the institution, according to established medical regimens. RESULTS: The program served a hard-to-reach population, 63% human immunodeficiency virus (HIV) positive, 64% substance users, 17% inadequately housed and 15% indigent. In the program's first three years there was 85% overall compliance with DOT visits. Using the completion of therapy index, 66% of patients completed therapy, 13% remained on treatment, 7% transferred to self medication and 1% were lost to follow up. No patient on DOT developed a drug resistant organism. There were no hospital readmissions for TB. CONCLUSION: The experience of this program demonstrates the efficacy of an intensive, personalized DOT program in ensuring treatment until cure.

Smith DA. **The need for tuberculosis education in the homeless male population.** Minor Nurse Newsl, 5(3):2, Summer 1998.

Weinreb L, Goldberg R, Perloff J. **Health characteristics and medical service use patterns of sheltered homeless and low-income housed mothers.** J Gen Intern Med, 13(6):389-97, June 1998.

OBJECTIVE: To compare the health characteristics and serviceutilization patterns of homeless women and low-income housed women who are heads of household. DESIGN: Case-control study. SETTING: Community of Worcester, Massachusetts. PARTICIPANTS: A sample of 220 homeless mothers and 216 low-income housed mothers receiving welfare. MEASUREMENTS AND MAIN RESULTS: Outcome measures included health status, chronic conditions, adverse lifestyle practices, outpatient and emergency department use and hospitalization rates, and use of preventive screening measures. Both homeless mothers and housed mothers demonstrated low levels of physical and role functioning and high levels of bodily pain. Prevalence rates of asthma, anemia, and ulcer disease were high in both groups. More than half of both groups were current smokers. Compared with the housed mothers, homeless mothers reported more HIV risk behaviors. Although 90% of the homeless mothers had been screened for cervical cancer, almost one third had not been screened for tuberculosis. After controlling for potential confounding factors, the homeless mothers, compared with the housed mothers, had more frequent emergency department visits in the past year (adjusted mean, homeless vs housed, 1.41 vs .95) and were significantly more likely to be hospitalized in the past year.

CONCLUSIONS: Both homeless mothers and low-income housed mothers had lower health status, more chronic health problems, and higher smoking rates than the general population. High rates of hospitalization, emergency department visits, and more risk behaviors among homeless mothers suggest that they are at even greater risk
of adverse health outcomes. Efforts to address gaps in access to primary care and to integrate psychosocial supports with health care delivery may improve health outcomes for homeless mothers and reduce use of costly medical care services.

1997

Barnes PF, Yang Z, Preston-Martin S, Pogoda JM, Jones BE, Otaya M, Eisenach KD, Knowles L, Harvey S, Cave MD. **Patterns of tuberculosis transmission in Central Los Angeles**. JAMA, 278(14):1159-63, Oct 8, 1997.

Recent studies suggest that many tuberculosis cases in urban areas result from recent transmission. Delineation of the epidemiologic links between patients is important to optimize strategies to reduce tuberculosis transmission. OBJECTIVE: To identify epidemiologic links among recently infected urban patients with tuberculosis. DESIGN: Prospective evaluation of patients with tuberculosis. SETTING: Central Los Angeles, Calif. PATIENTS: A total of 162 patients who had culture-proven tuberculosis. INTERVENTIONS: Patients were prospectively interviewed to identify their contacts and whereabouts. The IS6110-based and pTBN12-based restriction fragment length polymorphism analyses were performed on Mycobacterium tuberculosis isolates. Patients whose isolates had identical or closely related restriction fragment length polymorphism patterns were considered a cluster. Unconditional logistic regression was used to identify independent predictors of clustering. RESULTS: A total of 96 (59%) of 162 patients were in 8 clusters. Only 2 of the 96 clustered patients named others in the cluster as contacts. The degree of homelessness was an independent predictor of clustering. Compared with non-clustered patients, patients in 6 clusters were significantly more likely to have spent time at 3 shelters and other locations when at least 1 patient in the cluster was contagious, and these locations were independent predictors of clustering. Among non-homeless persons, clustered patients were significantly more likely than non-clustered patients to have used daytime services at 3 shelters. CONCLUSIONS: 1) Traditional contact investigation does not reliably identify patients infected with the same M tuberculosis strain and 2) locations at which the homeless congregate are important sites of tuberculosis transmission for homeless and non-homeless persons. Measures that reduce tuberculosis transmission should be based on locations rather than on personal contacts.

Burman WJ, Cohn DL, Rietmeijer CA, Judson FN, Sbarbaro JA, Reves RR. **Noncompliance with directly observed therapy for tuberculosis. Epidemiology and effect on the outcome of treatment**. Chest, 111(5):1168-73, May 1997. Comment in: Chest, 111(5):1151-3, May 1997.

STUDY OBJECTIVES: To describe the epidemiology and clinical consequences of noncompliance with directly observed therapy (DOT) for treatment of tuberculosis. DESIGN: Retrospective review. SETTING: An urban tuberculosis control program that emphasizes DOT. PATIENTS: All patients treated with outpatient DOT from 1984 to 1994. MEASUREMENTS AND RESULTS: We defined noncompliance as follows: (1) missing > or = 2 consecutive weeks of DOT; (2) prolongation of treatment > 30 days due to sporadic missed doses; or (3) incarceration for presenting a threat to public health. Poor outcomes of therapy were defined as a microbiologic or clinical failure of initial therapy, relapse, or death due to tuberculosis. Fifty-two of 294 patients (18%) who received outpatient DOT fulfilled one or more criteria for noncompliance. Using multivariate logistic regression, risk factors for noncompliance were alcohol abuse and homelessness.

Noncompliant patients had poor outcomes from the initial course of therapy more often than compliant patients: 17 of 52 (32.7%) vs 8 of 242 (3.3%). CONCLUSIONS: In an urban tuberculosis control program, noncompliance with DOT was common and was closely associated with alcoholism and homelessness. Noncompliance was associated with a 10-fold increase in the occurrence of poor outcomes from treatment and accounted for most treatment failures. Innovative programs are needed to deal with alcoholism and homelessness in patients with tuberculosis.

Burman WJ, Cohn DL, Rietmeijer CA, Judson FN, Sbarbaro JA, Reves RR. **Short-term incarceration for the management of noncompliance with tuberculosis treatment.** Chest, 112(1):57-62, July 1997. Comment in: Chest, 112(1):5-6 , July 1997.

STUDY OBJECTIVES: To review the use of incarceration for noncompliance with tuberculosis (TB) treatment. DESIGN: Retrospective review. SETTING: An urban tuberculosis control program. PATIENTS: Patients treated for active TB. MEASUREMENTS AND RESULTS: We reviewed the legal basis and practical application of quarantine for active TB, including the use of incarceration for noncompliance. The records of patients treated at the Denver Metro Tuberculosis Clinic during 1984 to 1994 were reviewed to identify patients who were incarcerated and to evaluate the effectiveness of this intervention. Of 424 cases of TB, 20 patients (4.7%) were incarcerated for noncompliance; an additional 21 patients (5.0%) were lost to follow-up prior to completing therapy. Incarcerated patients were predominantly men who were born in the U. S. and had a history of homelessness and alcohol abuse. The median duration of the initial incarceration was 20 days (range, 7 to 51 days). Of the 17 patients released prior to completing therapy, 13 (76%) were compliant with outpatient, directly observed therapy after one or two short-term incarcerations (<60 days); only three patients were incarcerated for the duration of treatment. Overall, 18 of 20 incarcerated patients (90%) were successfully treated. CONCLUSIONS: Approximately 5% of the patients treated through our program were incarcerated for noncompliance; an additional 5% were unavailable for follow-up and would have been candidates for incarceration if found. Homelessness and alcoholism were closely associated with the use of incarceration. Short-term incarceration followed by outpatient, directly observed therapy was relatively successful in the management of this difficult patient population.

Centers for Disease Control and Prevention. **Tuberculosis 2000: Fundamentals of clinical tuberculosis and tuberculosis control**. Rockville, MD: Centers for Disease Control, Jan 23, 30 and Feb 6, 1997.

This course syllabus was designed to bring the latest information about clinical tuberculosis (TB) and TB control. The course, which was originally presented via satellite, was divided into three two-hour sessions, each featuring presentations by leading experts on tuberculosis. The syllabus provides outlines for each presentation, including text copy from slides used during the presentations. Topics include: diagnosis; treatment; screening; prevention; institutional control measures; personal respiratory protection; HIV; pediatric TB; public health measures; and health care policy and TB control.

Gelberg L, Panarites CJ, Morgenstern H, Leake B, Andersen RM, Koegel P. **Tuberculosis skin testing among homeless adults.** J Gen Intern Med, 12(1):25-33, Jan 1997.

OBJECTIVE: To document the prevalence of tuberculosis (TB) skin test positivity among homeless adults in Los Angeles and determine whether certain characteristics of homelessness were risk factors for TB. DESIGN: Cross-sectional study. SETTING: Shelters, soup lines, and outdoor locations in the Skid Row and Westside areas of Los Angeles. PARTICIPANTS: A representative sample of 260 homeless adults. MEASUREMENTS AND MAIN RESULTS: Tuberculosis tine test reactivity was measured. The overall

prevalence of TB skin test positivity was 32%:40% in the inner-city Skid Row area and 14% in the suburban Westside area. Using multiple logistic regression, TB skin test positivity was found to be associated with living in crowded or potentially crowded shelter conditions, long-term homelessness, geographic area, history of a psychiatric hospitalization, and age. CONCLUSIONS: Homeless adults living in congested inner-city areas are at high risk of both latent and active TB. Endemic risk factors and limited access to medical care support the need for aggressive treatment of active TB cases and innovative programs to ensure completion of prophylactic regimens by homeless individuals with latent infection.

Griffiths-Jones A. **Tuberculosis in homeless people**. Nurs Times, 93(9):60-1, Feb 4, 1997.

Lau EA, Ferson MJ. **Surveillance for tuberculosis among residents of hostels for homeless men.** Aust N Z J Public Health, 21(5):447-50, Aug 1997.

Tuberculosis has been recognized as an important health problem among homeless persons. The New South Wales tuberculosis screening program for residents of hostels for the homeless has been in operation for several years, but has not yet been evaluated. This study reviewed the performance of the tuberculosis surveillance program (which uses mobile chest x-ray screening) between 1989 and 1993 at the five major hostels for homeless men in the eastern Sydney area. Reports of the screening x-rays and records of subsequent follow-up examinations at chest clinics were examined; information on cases detected by the screening program was compared with notifications in the same population. Of 3555 residents screened during 23 visits, 506 (14.2 per cent) were found to have an abnormal chest x-ray. However, only two active cases of tuberculosis were diagnosed as a result of the screening program, while seven cases were notified on the basis of clinical presentation. About 50 per cent of those with an abnormal chest x-ray from the screening program were lost to follow-up. Possible reasons for loss to follow-up were: long delays in making chest clinic appointments; short-stay residents changing shelters without trace; and high prevalence of severe mental illness or organic brain syndrome among residents. Raising awareness of the disease among primary health care and welfare staff who work with homeless men may be a more effective approach to improving identification of cases of active tuberculosis in this population.

Mangura BT, Passannante MR, Reichman LB. **An incentive in tuberculosis preventive therapy for an inner city population.** Int J Tuberc Lung Dis, 1(6):576-8, Dec 1997.

SETTING: Measures known to improve adherence such as short course chemoprophylaxis and directly observed therapy can be enhanced to a significant extent/by the use of incentives. Adherence to tuberculosis therapy is influenced by several factors, including the health care system, complexity of therapeutic regimens and patient's characteristics. Individual factors that negatively influence patient's adherence are the most difficult to counter. Preventive tuberculosis therapy is doubly challenging because the benefit of treatment is not felt, while toxicity from the medication, when it occurs, is experienced immediately. Ingenious incentives therefore have to make it worth the patient's while. During a study on preventive regimens, a request for an incentive, Sustacal, was observed to help completion of preventive regimens. Components of individual TB programs may help in patient adherence; it is important for health care staff to identify these aspects and, if they are successful, utilize these as an incentive to complete treatment.

McCurdy SA, Arretz DS, Bates RO. **Tuberculin reactivity among California Hispanic migrant farm workers.** Am J Ind Med, 32(6):600-5, Dec 1997.

We conducted a cross-sectional study of tuberculin reactivity among residents of two northern California migrant-farm-worker housing centers. Participants completed a brief health questionnaire and were offered tuberculin skin testing with radiologic and medical follow-up. Four hundred and sixty-nine persons (estimated participation rate: 70%) completed questionnaires. All but one were Hispanic. Two hundred and ninety-six (63%) participants completed tuberculin skin testing and 49 (16.6%) showed reactivity (> or = 10 mm induration at 48-72 hours). Increased prevalence was seen for the 15-39-year age group (vs. persons younger than 15, former smokers (vs. never smokers), and persons born outside the U.S. Prophylaxis with isoniazid was recommended for 23 persons; nine (39%) completed therapy. No cases of active TB were found. Prevalence of tuberculin reactivity in this population is lower than reported among Hispanic farm workers in the eastern and mid-western U.S. Higher prevalence may obtain among California farm workers not included in the study population, including homeless, single, and highly mobile persons. Public-health efforts in this population should focus on ever-smokers, young adults, and persons born outside the U.S.

McQuistion HL, Colson P, Yankowitz R, Susser E. **Tuberculosis infection among people with severe mental illness.** Psych Serv, 48(6):833-5, 1997.

In a study of the prevalence of TB infection and risk factors among people with severe mental illness, 71 participants in a psychiatric day program were given a tuberculin skin test. Twelve of the 71 subjects had positive results; none had active TB. Those with TB infection were more likely to be immigrants and to be above the study group's median age of 32. Eleven of the 12 infected subjects had experienced at least one of 7 risk factors, which suggests that more clinical attention should be placed on TB infection in this population.

Morrow R, Fanta J, Kerlen S. **Tuberculosis screening and anergy in a homeless population**. J Am Board Fam Pract, 10:1-5, Jan-Feb 1997.

BACKGROUND: Tuberculosis has again emerged as a growing public health concern in the United States. Among the homeless population, increased risk factors contribute to immunodeficiency, which can cause false-negative results on purified protein derivative (tuberculin) (PPD) skin testing, the standard screening procedure for tuberculosis in individuals. We evaluated the accuracy of PPD skin test results by determining anergy status of patients when offering the PPD test. METHODS: A consecutive convenience sample of 105 underserved men and women were tested at a health clinic located in a homeless shelter in Yonkers, N.Y. These persons were currently homeless, living in a shelter, or formerly homeless and using the soup kitchen at the shelter. Three antigens, candidin, mumps, and trichophytin, in addition to PPD, were administered intradermally using the Mantoux method, and results were read 48 to 72 hours later on the 100 (95%) who returned. An individual was considered to be anergic if the delayed-type hypersensitivity reactions were less than or equal to 2 mm for each of the four antigens. RESULTS: Of the 100 persons who returned for follow-up, five (5%) were found to be anergic. Of these five, all were previously known to be positive for human immunodeficiency virus (HIV). CONCLUSIONS: PPD testing alone was found to be an accurate screening test in this population except in those who were HIV positive.

Oscherwitz T, Tulsky JP, Roger S, Sciortino S, Alpers A, Royce S, Lo B. **Detention of persistently nonadherent patients with tuberculosis.** JAMA, 278(10):843-846, September 10, 1997. Comment in:

JAMA, 278(10):865-7, Sept 10, 1997.

CONTEXT: Patients with tuberculosis (TB) who are persistently nonadherent to treatment present a public health risk. In 1993, California created a new civil detention process and allowed detention of noninfectious but persistently nonadherent patients. OBJECTIVES: To determine (1) which patients TB controllers attempt to detain; (2) how often and where patients are detained; and (3) how many of these patients complete TB treatment. DESIGN: Case series with cross-sectional comparison to other adult TB patients in the study counties. SETTING: Twelve California counties with the largest number of new TB cases reported in 1994. SUBJECTS: All patients whom TB controllers sought to detain during 1994 and 1995 because of persistent nonadherence to treatment. DATA SOURCES: Public health records, interviews with county TB officials, and Reports of Verified Cases of TB to the California Tuberculosis Control Branch. RESULTS: TB controllers sought the civil detention or arrest of 67 patients during the study period (1.3% of adult TB patients with the same disease sites). Forty-six percent of these patients were homeless, 81% had drug or alcohol abuse, and 28% had mental illness. TB controllers sought civil detention of 15 patients. Fourteen patients were detained (median length of detention, 14.5 days). TB controllers sought to arrest 62 patients during the study period. Fifty-three patients were arrested (median time in jail, 83 days). In 10 cases, both civil and criminal detention were attempted. We analyzed completion of therapy after excluding patients who were not detained or who died or moved. Overall, 41 (84%) of the remaining 49 detained patients completed therapy. Of the patients who completed therapy, 17 were detained until treatment was completed. Compared with other TB patients in these counties, detained patients had four times the proportion lost to follow-up and half the proportion completing therapy within 12 months. CONCLUSION: Further improvements in the care of persistently nonadherent patients may require more psychosocial services, appropriate facilities for civil detention, and detaining patients long enough to assure completion of treatment.

Pablos-Mendez A, Knirsch CA, Barr RG, Lerner BH, Frieden TR. **Nonadherence in tuberculosis treatment: Predictors and consequences in New York City.** Am J Med, 102(2):164-70, Feb 1997.

BACKGROUND: Poor adherence to antituberculosis treatment is the most important obstacle to TB control. PURPOSE: To identify and analyze predictors and consequences of nonadherence to antituberculosis treatment. PATIENTS/METHODS: Retrospective study of a citywide cohort of 184 patients with TB in NYC, newly diagnosed by culture in April 1991-before the strengthening of its control program-and followed up through 1994. Follow-up information was collected through the NYC TB registry. Nonadherence was defined as treatment default for at least 2 months. RESULTS: Of the 184 patients, 88 (48%) were nonadherent. Greater nonadherence was noted among blacks, injection drug users, homeless, alcoholics, and HIV-infected patients; also, census-derived estimates of household income were lower among nonadherent patients. Only injection drug use and homelessness predicted nonadherence, yet 46 (39%) of 117 patients who were neither homeless nor drug users were nonadherent. Nonadherent patients took longer to convert to negative culture (254 vs .64 days), were more likely to acquire drug resistance, required longer treatment regimens (560 vs. 324 days), and were less likely to complete treatment. There was no association between treatment adherence and all-cause mortality. CONCLUSIONS: In the absence of public health intervention, half the patients defaulted treatment for two months or longer. Although common among the homeless and injection drug users, the problem occurred frequently and unpredictably in other patients. Nonadherence may contribute to the spread of TB and the emergence of drug resistance, and may increase the cost of treatment. These data lend support to directly observed therapy in TB.

Poss J, Rangel R. **A tuberculosis screening and treatment program for migrant farmworker families.** J Health Care Poor Underser, 8(2):133-40, May 1997.

Tuberculosis is one of the chief public health concerns in migrant farm workers. This paper describes the results of a community health outreach program conducted during the 1994 and 1995 migrant seasons to provide tuberculosis screening and treatment for migrant farm workers and their families in Orleans and Monroe counties in northwest New York State.

Redd JT, Susser E. **Controlling tuberculosis in an urban emergency department: A rapid decision instrument for patient isolation.** Amer J Pub Health, 87(9):1543-7, 1997.

This study examined whether data routinely available in emergency departments could be used to improve isolation decisions for tuberculosis patients. In a large emergency department in New York City, we compared the exposure histories of tuberculosis culture-positive and culture-negative patients and used these data to develop a rapid decision instrument to predict culture-positive tuberculosis. The screen used only data that are routinely available to emergency physicians. The method had hight sensitivity (.96) and moderate specificity (.54). The study concluded that the method is easily adaptable for a broad range of settings and illustrates the potential benefits of applying basic epidemiologic methods in a clinical setting.

Serwint JR, Hall BS, Baldwin RM, Virden JM. **Outcomes of annual tuberculosis screening by Mantoux test in children considered to be at high risk: Results from one urban clinic**. Pediatrics, 99:529-33, April 1997.

BACKGROUND: In January 1994, the American Academy of Pediatrics recommended that annual screening with the purified protein derivative tuberculin skin test, Mantoux method, be used for tuberculosis screening in high-risk children. This test has a better sensitivity and specificity than the previously used multiple puncture test, and patients need to return for a reading done by palpation by a health care professional. OBJECTIVE: To estimate the prevalence of reactivity to purified protein derivative tuberculin in an urban primary care clinic whose patients meet high-risk criteria and to determine if annual screening is warranted, to determine the adherence to return to the clinic for reading of the skin test, and to describe the characteristics of patients who have tuberculosis infection and disease. RESEARCH DESIGN: Cross-sectional study. SETTING: Inner-city, hospital-based primary care pediatric clinic in Baltimore, Md. SUBJECTS: A total of 1433 consecutive children attending this clinic from March through September 1994, who were at risk for tuberculosis because of frequent exposure to poor and medically indigent city dwellers. METHODS: The Mantoux test (5TU intradermal injection of purified protein derivative) was administered to children at annual health supervision visits. Patients were tracked to determine those who returned for a reading by a health care professional and find those with a positive Mantoux test. The charts of children with a positive test were reviewed. RESULTS: Five hundred seventy-three (40%) patients returned for a reading by a health care professional. Five patients had a positive Mantoux test, giving a prevalence rate of 0.8% of reactivity to purified protein derivative tuberculin. One child with a positive Mantoux test also had chest radiograph findings consistent with tuberculosis disease but was asymptomatic. CONCLUSIONS: In our city with a low prevalence of disease, children whose only risk factor for tuberculosis was exposure to poor and medically indigent city dwellers did not represent a high-risk group. Our results are supportive of the 1996 American Academy of Pediatrics screening statement that annual screening is not warranted. Sixty percent of children did not return for a reading of the Mantoux test by a health care professional. Alternative strategies that are more convenient for parents are needed to obtain accurate readings by health care professionals when skin testing is deemed necessary.

Weis SE. **Universal directly observed therapy. A treatment strategy for tuberculosis.** Clin Chest Med, 18(1):155-63, 1997.

Patient adherence to prescribed TB regimens must be assured to prevent relapse, acquired resistance, and transmission. Directly observed therapy (DOT), an outpatient management strategy designed to ensure adherence, is not widely used because it is perceived to be inordinately expensive. This article discusses universal (observed therapy for all patients), as opposed to selective (observed taking medications only if certain selection criteria are satisfied), DOT in the treatment of TB patients. Topics addressed include cost, efficacy, nonadherence, and implementation guidelines.

1996

Barnes PF, el-Hajj H, Preston-Martin S, Cave MD, Jones BE, Otaya M, Pogoda J, Eisenach KD. **Transmission of tuberculosis among the urban homeless**. JAMA, 275:305-7, Jan 24-31, 1996.

OBJECTIVE: To determine the relative frequencies of primary and reactivation tuberculosis in the urban homeless. DESIGN: Prospective evaluation of homeless tuberculosis patients. SETTING: Central Los Angeles, Calif. PATIENTS: Thirty-four homeless patients with culture-proven tuberculosis. INTERVENTIONS: IS6110-based restriction fragment length polymorphism (RFLP) analysis was performed on Mycobacterium tuberculosis isolates. If results were inconclusive, pTBN12-based RFLP analysis was performed. MAIN OUTCOME MEASURE: Clustering of M tuberculosis isolates. A cluster consisted of two or more isolates with indistinguishable RFLP patterns. RESULTS: Twenty-four of 34 homeless patients had clustered isolates in six clusters. CONCLUSIONS: The minimum percentage of cases due to primary tuberculosis in the homeless was estimated to be 53%, compared with the traditional estimate of 10% in the general population. The results suggest that primary tuberculosis caused the majority of tuberculosis cases in this population of the urban homeless in central Los Angeles.

Caminero JA, Pavon JM, Rodriguez de Castro F, Diaz F, Julia G, Cayla JA, Cabrera P. **Evaluation of a directly observed six months fully intermittent treatment regimen for tuberculosis in patients suspected of poor compliance.** Thorax, 1(11):1130-3, Nov 1996.

BACKGROUND: Although a priority for tuberculosis control is to achieve the maximum cure rate, compliance with chemotherapy in specific high-risk groups (homeless, intravenous drug abusers, chronic alcoholics) is usually poor. METHODS: From January 1990 to December 1994 102 patients with tuberculosis (96 pulmonary, six extrapulmonary) who were poorly compliant with treatment were treated with a six month fully intermittent (twice weekly) directly observed regimen. They comprised 71 homeless subjects, 50 chronic alcoholics, 23 intravenous drug abusers, nine infected with HIV, and 11 who had previously abandoned a daily antituberculosis regimen; 53 had more than one of these risk factors. Treatment included isoniazid and rifampicin for six months and pyrazinamide during the first two months. Patients who failed to take their medication on two consecutive occasions were actively sought by telephone or by personal search. RESULTS: After two months of treatment 95 of the 102 patients had taken their medication regularly and 90 of them had negative cultures. Four of the remaining patients had negative cultures after three months. At the end of the six months 87 patients had completed treatment and were considered cured. Only 15 patients abandoned the treatment (13 of whom had more than one risk factor). Only three relapses occurred in the 102 patients at one year follow up and in the 88 patients followed for two years. Two patients required a change of treatment due to major side effects. Although intravenous drug abuse was the only predictor of non-compliance in the multivariate analysis, if the available variables in the second month of treatment were analyzed, current poor compliance and abandonment of treatment in the past were found to be significantly associated with non-compliance. CONCLUSIONS: This study shows the efficacy of this intermittent regimen

and the effectiveness of a directly observed treatment program.

Diez E, Claveria J, Serra T, Cayla JA, Jansa JM, Pedro R, Villalbi JR. **Evaluation of a social health intervention among homeless tuberculosis patients.** Tuber Lung Dis, 77:420-4, Oct 1996.

SETTING: Homeless and other fringe groups are a priority in the global strategies of tuberculosis prevention and control in big cities, as a consequence of their generally poor adherence to treatment and concurrent multiple social and health problems. OBJECTIVE: To evaluate a social care and health follow-up program targeting homeless tuberculosis patients in Ciutat Vella District, Barcelona, which covered 210 patients from 1987 to 1992. During directly observed treatment, primary health care and, if necessary, accommodation was provided. DESIGN: The differential tuberculosis incidence rate between Ciutat Vella and the other districts of Barcelona, the percentage of successfully completed treatments and the days of hospitalization saved by the program were measured. RESULTS: There was a significant decrease in the tuberculosis incidence rate among homeless patients in Ciutat Vella (from 32.4 per 10(5) inhabitants in 1987, to 19.8 per 10(5) in 1992,), compared to an unchanged rate elsewhere (1.6 per 10(5) inhabitants in 1987, compared to 1.7 per 10(5) in 1992). A smaller than expected proportion, 19.6%, of patients failed to complete their treatment, and a decrease in the mean period of hospitalization for tuberculosis in the district hospital was recorded, falling from a mean 27.1 days in 1986 to a mean 15.7 days in 1992. CONCLUSION: The program appears to be both effective and efficient, as it has enabled a large number of homeless patients to complete their treatment successfully, at the same time saving twice the amount of funds invested.

Frieden TR, Woodley CL, Crawford JT, Lew D, Dooley SM. **The molecular epidemiology of tuberculosis in New York City: The importance of nosocomial transmission and laboratory error**. Tuber Lung Dis, 77(5):407-13, Oct 1996.

SETTING: During the 1980s, New York City experienced a rapid increase of TB cases, more than 40% of which were human immunodeficiency virus (HIV)associated. OBJECTIVE: To better define the molecular epidemiology of tuberculosis in New York City. DESIGN: We collected an isolate from every patient in New York City with a positive culture for Mycobacterium tuberculosis, including both incident and prevalent cases, in April 1991. Restriction fragment length polymorphism (RFLP) analysis using IS6110 was performed and the clinical, demographic, epidemiologic, and drug susceptibility patterns of patients were correlated with RFLP results. RESULTS: Of 441 patients, 12 (3%) had laboratory, clinical, and RFLP evidence of falsely positive cultures. The remaining 429 patients had 252 distinct RFLP patterns. Patients with clustered 1-3 band isolates did not share demographic or drug susceptibility patterns. Eliminating these patients from the analysis, 344 patients remained, of whom 126 (37%) belonged to one of 31 clusters ranging in size from 2-17 patients. Clustering was more common among patients with multidrug-resistant isolates (53%), African Americans (44%), and the homeless (49%), but was not associated with HIV /AIDS, Multidrug-resistance, being African American, and homelessness remained independently associated with clustering in multivariate analysis. Of 79 patients in clusters of > or = 4 patients, 25 (32%) had identifiable epidemiologic linkages; 17 (74%) of these patients, and 6% of all cases, were documented to have been nosocomially associated. CONCLUSION: A small but non-negligible proportion (3%) of New York City patients had falsely positive cultures for M. tuberculosis as a result of laboratory error. More than one third of all patients and most patients with multidrug-resistance in April 1991 had clustered RFLP patterns, suggesting recent transmission of M. tuberculosis. Homelessness, multidrug-resistance, & being African American independently increased the risk of clustering. Most of the identified epidemiologic linkages and 6% of all cases resulted from transmission in hospitals.

Jackson MM. **Pulmonary tuberculosis in a homeless person**. Am J Infect Control, 24:294-8, Aug 1996.

Tuberculosis disproportionately affects certain segments of society, such as the homeless, and can cause extremely serious disease among persons with severely impaired cellular immunity, especially those with HIV

infection. Inhalation of droplet nuclei, which are the airborne residual of droplets expelled from an infected host, is the primary means of transmission. Factors associated with transmission in shelters for the homeless include crowding, inadequate ventilation, and poor compliance with drug therapy. One of the greatest challenges to treatment of this infection among the homeless is the provision of adequate follow-up of patients who have begun therapy. Many individuals do not complete their treatment regimen. This creates an environment in which the transmission of tuberculosis, including multi-drug-resistant strains, can occur. Prevention strategies should focus on rapid identification and treatment of persons with active disease and latent tuberculosis infections. Ventilation with good exchange of fresh air or the addition of air cleaning devices may aid in reducing risks of transmission of disease.

Mayo K, White S, Oates SK, Franklin F. **Community collaboration: prevention and control of tuberculosis in a homeless shelter**. Public Health Nurs, 13:120-7, April 1996.

An urban shelter in Charleston, So. Carolina, developed and began a tuberculosis (TB) prevention and control plan that addressed the priorities recommended by the Centers for Disease Control and Prevention. After an increase in TB in the shelter in 1992, the local health department, the homeless clinic nurse practitioners, and Medical University of South Carolina College of Nursing faculty and students collaborated with the shelter staff to provide initial mass screenings for contact investigation. They also developed and implemented new policies and procedures for an ongoing TB prevention and control program. The new policies required that guests obtain screening for TB within seven days of arrival at the shelter and every six months thereafter. Also, a public health nurse began providing directly observed therapy twice weekly at the shelter. Of the initial 22 persons who started TB preventive therapy in 1993, 17 (77%) completed therapy. The clinic nurse practitioners, nursing students, and public health nurses had important and defined roles in the mass-screening process, case identification and treatment, policy development and implementation, health education, and establishing methods of communication between the shelter, clinic, and health department. An ongoing health care community collaborative effort may successfully reduce tuberculosis disease in a homeless shelter population.

Newman J. **The resurgence of TB and its implications for radiology**. Radiol Technol, 67(5):379-96, May 1996.

Tuberculosis (TB) is re-emerging as a major health threat. Between 1985 and 1990, the number of TB cases reported in the United States increased by more than 15%. In addition, multidrug-resistant strains of Mycobacterium TB have begun to proliferate. Multidrug-resistant tuberculosis is extremely difficult to treat and is associated with high mortality rates. TB poses tremendous risk to certain populations, including HIV-positive or otherwise immunocompromised patients, the homeless and individuals in correctional facilities or nursing homes. Also, TB is the sixth most common occupationally acquired infection among laboratory workers. This article traces the etiology of TB and outlines diagnostic techniques and treatment modalities. It also discusses the role of radiologic technologists in screening patients with suspected TB.

Pablos-Mendez A, Sterling TR, Frieden TR. **The relationship between delayed or incomplete treatment and all-cause mortality in patients with tuberculosis**. JAMA, 276(15):1223-8, October 16, 1996. Comment in: JAMA, 276(15):1259-60, Oct 16, 1996.

OBJECTIVE: To analyze the factors associated with survival in patients with pulmonary and extrapulmonary TB in New York City. DESIGN: Observational study of a citywide cohort of TB cases. SETTING: New York City, April 1991, before the strengthening of its control program. PATIENTS: All 229 newly diagnosed cases of TB documented by culture in April 1991. Most patients (74%) were male, and the median age was 37 years (range, 1-89 years); 89% belonged to minority groups. HIV infection was present in 50% and multidrug resistance in 7%. Twenty-one patients (9%) were not treated. OUTCOME MEASURES: Follow-up information was collected through the New York City TB registry; death from any cause was verified through the National Death Index. RESULTS: Cumulative all-cause mortality by October 1994 was 44%; the median survival for those who died was 6.3 months (range, 0 days to 3 years). The most important baseline predictors of mortality were AIDS (91% vs. 11% in HIV-seronegative patients), multidrug resistance (87% vs 39% in pansensitive cases, and lack of treatment (81% vs 40%). Also, 11 of 13 HIV-infected patients who started treatment after a 1-month delay died. Among 173 patients surviving the recommended treatment period, those who completed therapy (66%) had a lower subsequent mortality (20% vs 37%). CONCLUSIONS: Mortality from TB was high, even among patients without multidrug resistance who were not known to be infected with HIV. Most HIV-seropositive patients with delayed therapy died. Multidrug resistance predicted higher mortality, and treatment completion was associated with improved subsequent patient survival.

Pilote L, Tulsky JP, Zolopa AR, Hahn JA, Schecter GF, Moss AR. **Tuberculosis prophylaxis in the homeless. A trial to improve adherence to referral** [see comments] Arch Intern Med, 156:161-5, Jan 22, 1996.

BACKGROUND: Adherence to tuberculosis evaluation is poor in a high-risk population such as the homeless. OBJECTIVE: To test two interventions aimed at improving adherence to tuberculosis evaluation and to identify predictors of adherence. METHODS: We conducted a randomized clinical trial in shelters and food lines in the inner city of San Francisco, Calif. We randomized 244 eligible subjects infected with tuberculosis to: (1) peer health adviser (assistance by a peer, n=83); (2) monetary incentive ($5 payment, n=82); or (3) usual care (referral slips and bus tokens only, n=79). The primary outcome of the study was adherence to a first follow-up appointment at the tuberculosis clinic, where subjects were evaluated for active tuberculosis and the need for isoniazid prophylaxis. RESULTS: Of the subjects assigned to a monetary incentive, 69 (84%) completed their first follow-up appointment, compared with 62 subjects (75%) assigned to a peer health adviser and 42 subjects (53%) assigned to usual care. Adherence was higher in the monetary incentive and peer health adviser groups than in the usual care group. Patients not using intravenous drugs and patients 50 years of age or older were more likely to adhere to a first follow-up appointment (2.5 and 3.3, respectively). Among the 173 tuberculosis-infected subjects who completed their appointment, isoniazid therapy was started for 72 individuals, and three cases of active tuberculosis were identified. CONCLUSION: A monetary incentive or a peer health adviser is effective in improving adherence to a first follow-up appointment in homeless individuals infected with tuberculosis. A monetary incentive appears to be superior. Intravenous drug users and young individuals are at high risk for poor adherence to referral.

Polesky A, Farber HW, Gottlieb DJ, Park H, Levinson S, O'Connell JJ, McInnis B, Nieves RL, Bernardo J. **Rifampin preventive therapy for tuberculosis in Boston's homeless**. Am J Respir Crit Care Med, 154:1473-7, Nov 1996.

An epidemic of isoniazid (INH)- and streptomycin (SM)-resistant tuberculosis began among Boston's homeless population in 1984. Individuals with skin test conversions who agreed to preventive therapy received either INH, rifampin, or a combination of INH and rifampin. A total of 204 individuals with documented tuberculin skin test conversions who did not have active tuberculosis at the time of the clinical evaluation for their positive skin test were eligible for preventive therapy. Data on type and length of preventive therapy were obtained from the Tuberculosis Clinic and the Boston Tuberculosis Registry records

at Boston City Hospital. The individuals were followed for development of active tuberculosis. Six of 71 (8.6%) individuals who received no therapy, three of 38 (7.9%) in the INH group, and none in the rifampin or rifampin plus INH groups (49 and 37 persons, respectively) developed active tuberculosis. Patients in the rifampin group were significantly less likely to develop tuberculosis than patients in the no therapy group. Treatment with any rifampin-containing preventive therapy (rifampin or rifampin plus INH) was effective in preventing development of active disease. The three INH failures were with organisms that were resistant to INH.

Sugarman PT, Faden R, Holmes D, Fogarty L, Pyeritz R. **Professional healthcare workers' attitudes toward treating patients with multidrug-resistant tuberculosis.** Journal of Clinical Ethics, 7(3):222-8, Autumn 1996.

Multidrug-resistant tuberculosis (MDRTB) poses a substantial risk to healthcare workers, causing some reluctance to care for patients with MDRTB. Although carefully designed infection-control programs promise to decrease the spread of MDRTB, attitudes of physicians and nurses toward treating patients with MDRTB may be crucial to the successful implementation theses programs (e.g., healthcare professionals' adoption and adherence to them) and to the clinical care of the patients. This article reports a survey of attitudes of physicians and nurses regarding treatment of patients with TB and MDRTB.

1995

Barclay DM 3rd, Richardson JP, Fredman L. **Tuberculosis in the homeless**. Arch Fam Med, 4:541-6, June 1995.

The prevalence of tuberculosis in the homeless is on the rise. The presence of human immunodeficiency virus and multidrug-resistant tuberculosis in the homeless has contributed to this high prevalence. Several factors, including alcoholism, substance abuse, and psychiatric illness, combine to make it difficult to diagnose and treat tuberculosis in the homeless. Medical providers are likely to encounter homeless individuals in a number of settings, including emergency departments, community and free clinics, public hospitals, and health maintenance organizations. Appropriate screening, prevention, and treatment should be undertaken in collaboration with local health departments. The use of directly observed therapy and of the treatment regimens published by the Centers for Disease Control and Prevention improves treatment outcomes among the homeless.

Centers for Disease Control and Prevention. **Screening for tuberculosis and tuberculosis infection in high-risk populations.** MMWR, 44(No. RR-11), 1995.

This report updates and replaces previous recommendations for screening for tuberculosis (TB) and TB infection among high-risk populations. In particular, these recommendations: (1) emphasize that screening for TB infection should not be given preference over higher priority TB prevention and control activities, especially identifying and completely treating all persons who have active TB as well as conducting prompt, effective contact investigation; (2) provide more detailed recommendations for screening specific high-risk groups; (3) provide a detailed description of the tuberculin skin test; and (4) revise CDC's previous recommendations regarding anergy testing. This report is for public health policymakers, administrators, program directors, and managers as well as health-care providers and others who provide care or services to persons at increased risk for TB infection and disease. AVAILABLE FROM: Office of Communications,

NCHSTP, CDC, 1600 Clifton Road NE, Mailstop E-06, Atlanta, GA 30333. DOWNLOAD at: *http://www.cdc.gov/nchstp/tb.*

Frieden TR, Fujiwara PI, Washko RM,,Hamburg MA. **Tuberculosis in New York City--turning the tide**. N Engl J Med, 333(4):229-3, July 27, 1995.

BACKGROUND: From 1978 through 1992, the number of patients with tuberculosis in New York City nearly tripled, and the proportion of such patients who had drug-resistant isolates of Mycobacterium tuberculosis more than doubled. METHODS: We reviewed, confirmed, and analyzed data obtained during the surveillance of patients with tuberculosis. RESULTS: From 1992 through 1994, there was a 21% decrease in reported cases of tuberculosis in New York City. An evaluation of the surveillance system revealed very few unreported cases. The number of cases decreased by more than 20% among blacks and Hispanics, persons with documented human immunodeficiency virus infection, homeless persons, and patients with multidrug-resistant tuberculosis; in all these groups, tuberculosis is likely to result from recent transmission. In contrast, the number of cases of tuberculosis increased among elderly and foreign-born persons, in whom the disease is likely to result from the reactivation of an infection acquired many years earlier. Enrollment in a program of directly observed therapy, in which health workers watch patients take their medications, increased from fewer than 100 patients to nearly 1300, with more than 32,000 patient-months of observation from 1992 through 1994. CONCLUSIONS: Epidemiologic patterns strongly suggest that the decrease in cases resulted from an interruption in the ongoing spread of M. tuberculosis infection, primarily because of better rates of completion of treatment and expanded use of directly observed therapy. Another contributing factor may have been efforts to reduce the spread of tuberculosis in institutional settings, such as hospitals, shelters, and jails. Expansion of measures to prevent and control tuberculosis and support of international control efforts are needed to ensure continued progress.

Kitazawa S. **Tuberculosis health education. Needs in homeless shelters**. Public Health Nurs, 12:409-16, Dec 1995.

Tuberculosis has reemerged as an important public health concern, particularly with the rise in multi-drug-resistant strains. The homeless are at increased risk for infection, for active disease, and for incomplete treatment. Public health authorities have recommended that tuberculosis health education materials be developed specifically for residents and staff of homeless shelters. In this study, a diverse sample of 20 adult homeless-shelter residents responded to open-ended questions regarding 1) their knowledge of tuberculosis and tuberculosis screening and treatment, 2) their perceptions of access to health care services related to tuberculosis, and 3) their views of health education regarding tuberculosis. The majority of the subjects had limited knowledge of tuberculosis and of screening and treatment for the disease. Many had misconceptions about the disease, particularly regarding its transmission. An analysis of the subjects' responses within the framework of the Health Belief Model indicated that basic tuberculosis health education programs for residents of homeless shelters are needed. The study findings indicated that a small-group educational format utilizing written materials and video aids might be most effective.

Kumar D, Citron KM, Leese J, Watson JM. **Tuberculosis among the homeless at a temporary shelter in London: Report of a chest x ray screening programme.** J Epidemiol Comm Health, 49:629-33, Dec 1995.

OBJECTIVE: To estimate the prevalence of active pulmonary tuberculosis in a homeless population in

London and to assess whether those with suspected disease could be integrated into the existing health care system for further follow up and treatment. DESIGN: Voluntary screening program based on a questionnaire survey and chest x-ray. SETTING AND CASES: Screening programs were set up over the Christmas period in 1992 and 1993 at a shelter for the homeless in London. An offer of screening was made to all individuals who visited the center and an interviewer-administered questionnaire was completed on those who volunteered for the screening. Chest x-rays were carried out, developed, and read on site. Individuals with chest x-rays features suggestive of tuberculosis or other medical problems were referred to a hospital. RESULTS AND OUTCOME: In 1992 nearly 1600 people visited the center, of whom 372 volunteered for the screening and 342 were x-rayed. Nineteen of the 342 (5.6%) had radiological features suggestive of active tuberculosis. In 1993 around 2000 homeless people visited the center, of whom 270 volunteered for the screening and 253 were x-rayed. Eleven (4.3%) had features consistent with active tuberculosis on the basis of the chest x-rays and clinical examination by a chest physician. Overall, of 595 people x-rayed in the two surveys, 30 (5%) had changes suggestive of active tuberculosis. Further investigations confirmed nine (1.5%) with active pulmonary disease and eight with no active tuberculosis. In 13, the diagnosis was not determined as four declined further investigation and nine did not attend their hospital appointment. CONCLUSION: Tuberculosis among the homeless remains a cause for concern. Follow up and treatment present unique difficulties. Services for the homeless need to include mechanisms for timely diagnosis and monitored treatment. Control programs designed for the needs of the homeless are required.

Layton MC, Cantwell MF, Dorsinville GJ, Valway SE, Onorato IM, Frieden TR. **Tuberculosis screening among homeless persons with AIDS living in single-room-occupancy hotels**. Am J Public Health, 85:1556-9, Nov 1995.

Congregate facilities for homeless persons with the acquired immunodeficiency syndrome (AIDS) are often endemic for tuberculosis. We evaluated tuberculosis screening methods at single-room-occupancy hotels housing persons with AIDS. Residents were screened by cross matching the New York City Tuberculosis Registry, interviewing for tuberculosis history, skin testing, and chest radiography. Cases were classified as either previously or newly diagnosed. Among the 106 participants, 16 (15%) previously diagnosed tuberculosis cases were identified. Participants' tuberculosis histories were identified by the questionnaire (100%) or by registry match (69%). Eight participants (50%) were noncompliant with therapy. These findings prompted the establishment of a directly observed therapy program on site.

McGowan JE Jr, Blumberg HM. **Inner-city tuberculosis in the USA.** J Hosp Infect, 30 Suppl:282-95, June 1995.

TB has become more common during the past five years in several areas of the USA. Occurrence has been facilitated by the increasing number of patients with concurrent HIV infection, by cases due to multiple-drug-resistant strains, by incomplete TB therapy among homeless and non-compliant patients, and by cases in immigrants from other countries where TB prevalence is high. These features mean that the major burden of TB today is being borne by inner-city health care facilities that care for the poor. This is illustrated by data from Atlanta, GA, where a large proportion of the new cases recognized in the metropolitan area are reported by Grady Memorial Hospital, the public hospital serving the indigent and working poor of the inner city. Similar patterns are recognized in the other US cities where TB has again become a blight. In view of these epidemiological features, minimizing innercity TB will require careful attention to diagnosis and isolation procedures in the hospital. Engineering changes at hospitals providing acute care of TB have recently been ordered by the federal government. These promise to be very expensive, and primarily affect the public hospitals, which can least afford them. Innovative treatment programs are essential, as follow-up after acute care is difficult in this setting. Directly observed therapy can help, but for some cases the era of the

TB hospital may have returned. Current attention focuses on legal and ethical issues associated with detaining non-compliant and recalcitrant patients to complete their therapy. Bacille Calmette Guerin (BCG) vaccine is not a priority for this setting at this time.

Mulligan DH. **The tuberculosis epidemic: legal and ethical issues for alcohol and other drug abuse treatment providers.** Rockville, MD: SAMHSA, Center for Substance Abuse Treatment, TIP 18, 1995.

Intended for alcohol and other drug (AOD) treatment administrators and staff, public health officials, corrections officials, state substance abuse officials, this Treatment Improvement Protocol (TIP) summarizes the latest advice and recommended protocols for dealing with the threat of TB in the AOD setting. It deals with the legal and ethical issues posed by the tuberculosis epidemic and represents CSAT's effort to encourage further and improved collaboration between the AOD field and others in preventing TB and other communicable diseases in the treatment setting. AVAILABLE FROM: National Clearinghouse for Alcohol and Drug Information, P.O. Box 2345, Rockville, MD20852, (800) 729-6686.

Schluger N, Ciotoli C, Cohen D, Johnson H, Rom WN. **Comprehensive tuberculosis control for patients at high risk for noncompliance**. Am J Respir Crit Care Med, 151:1486-90, May 1995.

The current tuberculosis epidemic in the United States is marked, in many areas, by high rates of noncompliance with antituberculous regimens. In response to this, a comprehensive program of medical, nursing, social services, and supervised therapy was developed at Bellevue Hospital. Most patients were referred to the on-site directly observed therapy program (DOT) located in the hospital. Patients on DOT received daily or twice weekly therapy, and were given incentives to enhance compliance. Outreach was used to track patients who missed appointments. From November 1992 through July 1993, 113 patients were referred. HIV infection, homelessness, illicit drug use, and alcoholism were common. Follow-up revealed that 11 patients were noncompliant and completely lost to follow-up; of the remaining 102, 99% achieved bacteriologic cure. Of the 102 patients who received therapy, 74 attended the Bellevue DOT clinic, 16 attended other DOT programs in the city or received medication at home, and three died of HIV-related, nontuberculous illness. Nine patients were self-medicated and judged treatment successes. We conclude that a comprehensive hospital-based tuberculosis control program is capable of achieving a high degree of success, even in a population at high risk for noncompliance.

Tuberculosis in homeless people. Commun Dis Rep CDR Wkly, 5(18):85, May 5, 1995.

Valvassori P. **Controlling the rise in tuberculosis among the homeless**. NP News, 3:3, 6, March-April 1995.

Wolf L. **A tuberculosis control plan for ambulatory care centers**. Nurse Pract, 20(6):34-6, June 1995. Comment in: Nurse Pract, 20(10):7, Oct 1995.

Tuberculosis and a multidrug resistant form of TB have reemerged in epidemic proportions. TB is more

prevalent among HIV-infected individuals, the homeless, foreign-born individuals from countries with high rates of TB, prison inmates, individuals in long-term care facilities, individuals from low-socioeconomic backgrounds, and intravenous drug users. Urgent care centers, which have gained popularity as an easy access to medical care, are at risk for seeing undetected infectious patients. By developing a TB control plan for ambulatory care centers, specific triage criteria can be instituted to promote early identification of the potentially infectious patient and provide guidelines for identification, prevention, environmental controls, education, and follow-up of exposed health care workers. This article discusses the mandatory OSHA policy for occupational exposure to tuberculosis based on the 1993 CDC guidelines for TB transmission and how a TB control plan for ambulatory care centers can be developed from these guidelines.

1994

Centers for Disease Control; and Prevention, Div. of Tuberculosis Elimination. **Improving Patient Adherence to Tuberculosis Treatment.** U.S. Dept. of Health and Human Services, CDC, 1994.

This booklet describes strategies and perspectives for improving adherence to TB treatment. These strategies are geared toward the concept of providing individualized services that are sensitive to the health, social, cultural, and economic needs of persons with TB. The booklet covers the following topics: basic assumptions underlying the care of persons with TB; getting to know your patient; predicting and assessing adherence; strategies for improving adherence; problem solving; adherence by children and adolescents; and legal remedies for ensuring adherence. This information is intended for health care workers who provide TB prevention and treatment services in a variety of settings. AVAILABLE FROM: CDC Voice Information System (404) 639-1819. Centers for Disease Control and Prevention.

Concato J, Rom WN. **Endemic tuberculosis among homeless men in New York City**. Arch Intern Med, 154:2069-73, Sept 26, 1994.

OBJECTIVES: The purpose of the study was to describe demographic and clinical characteristics of patients at the only long-term care facility for homeless men with tuberculosis in New York City, and to evaluate the outcome of a directly observed therapy program for these men. METHODS: The study population included residents at the "tuberculosis unit" for men in the New York City municipal shelter system. A cross-sectional survey described the characteristics of 76 men in the unit during November 1991. A retrospective cohort study evaluated 104 consecutive admissions to the facility from October 1, 1990, through March 30, 1991, and determined the outcome of directly observed therapy. RESULTS: Cross-sectional survey. The median age was 43 years (range, 25 to 60 years); 67 patients (88%) had pulmonary tuberculosis. Among 58 isolates of Mycobacterium tuberculosis, eight were resistant to one drug (14%) and an additional nine were resistant to at least two drugs (16%). A history of previous treatment was associated with an odds ratio of 5.1 for having multiple drug-resistant tuberculosis (exact 95%). Retrospective cohort. Excluding 21 men whose care was transferred to other agencies or institutions, 39 (47%) of 83 subjects completed or were still receiving treatment after 12 months and 44 (53%) of 83 subjects failed to complete the program. CONCLUSIONS: Previous treatment for tuberculosis among homeless men is associated with an increased risk of having multiple-drug resistance. A directly observed therapy program successfully treated less than half of the enrolled subjects. Increased efforts are needed to control the spread of tuberculosis among homeless individuals.

Leonhardt KK, Gentile F, Gilbert BP, Aiken M. **A cluster of tuberculosis among crack house contacts in San Mateo County, California**. Am J Public Health, 84:1834-6, Nov 1994

In March 1992, a cluster of 89 persons with tuberculosis infection was identified in San Mateo County, California. Thirteen persons (15%), including 11 children, were diagnosed with active pulmonary tuberculosis. All contacts were African Americans who resided in or visited one of two houses used for crack cocaine smoking or dealing. The patient with the index case, a male infected with human immunodeficiency virus, contributed to the transmission of tuberculosis as a transient resident of several dwellings. Public health authorities applied unique intervention methods to control the outbreak, including the use of a mobile health van. Further innovative strategies will be necessary to meet the challenge of this reemerging disease.

National Health Care for the Homeless Council. **Combating tuberculosis and homelessness: Recommendations for policy and practice.** Nashville, TN: National Health Care for the Homeless Council, Inc. 1994.

This paper discusses tuberculosis (TB) among the homeless population. The first section provides a history of tuberculosis, its epidemiology in the United States, and the experiences homeless individuals have had with TB. The second section discusses the provision of health care to homeless individuals at risk for TB. The third section highlights policy and treatment recommendations for responding to TB among the homeless population. AVAILABLE FROM: National Health Care for the Homeless Council, P.O. Box 60427, Nashville, TN 37206-0427, (615) 226-2292.

1993

Altarac D, Nichols SE, Richman BL, Drennan C. **A model tuberculosis testing program in a high risk substance abuse population**. Int Conf AIDS, 9:874 (abstract no. PO-D18-3939), June 6-11, 1993.

OBJECTIVE: To describe successful tuberculosis (TB) testing in substance abuse patients at high risk for HIV and TB with poor adherence to previous testing efforts. METHODS: Testing was conducted in a 400 patient Central Harlem MMTP clinic with a HIV seroprevalence rate of 40% to 50%. Patients and staff were educated about TB through discussions, training sessions, bilingual memos, brochures, and videos. Chart review determined that 321 patients required testing. During the test week, routine clinic activities were suspended, staff, reassigned, and patient schedules altered to facilitate implantation and reading without extensive waiting periods or appointments. For patients with positive PPS's or cutaneous anergy, chest x-rays were ordered and HIV testing recommended. RESULTS: On days 1 and 2, 289 patients (90%) were tested. Of these, 280 test results (96.8%) were obtained within 72 hours, and 288 (98.7%) by week end (five patients PPD+ at 96 hours, two reimplanted, one incarcerated). On days 3-6, another 32 patients were tested and read. Thus, all 321 patients were tested and 320 (99.7%) had the test read. Results indicated that 174 (54%) patients required chest x-rays; 152 (87%) had the chest x-ray within the required time interval, 11 (6%) did not, ten (6%) were hospitalized or incarcerated, and one expired. Thus, 163 patients were available for chest x-ray, and 152 (93%) adhered to the recommendation. Analysis indicates that there are no significant differences with regard to gender, age, ethnicity, treatment schedule, or time in treatment between patients who adhered to the recommendations and those who did not. CONCLUSIONS: 1) Successful and efficient public health interventions are feasible in inner-city/substance abuse facilities with high rates of HIV infection and 2) In this population, adherence appeared to be dependent on perceived importance of program, staff motivational and educational support, and convenience and uniformity of testing.

Bailey SB. **Improving the quality of healthcare delivery to homeless tuberculosis patients: A new approach.** J Healthc Qual, 15(2):20-3, March-April 1993.

ADoing things the same old way@ can lead to complacency and eventually to a breakdown in the health care system. Such is the case with the deadly disease tuberculosis. While TB was thought to be a disease of the past, the United States is experiencing an alarming rise in the incidence of the disease, especially among those least likely to get help to stick to a treatment program. This article explores a more creative approach for reaching out to treat homeless people who have TB.

Dwyer B, Jackson K, Raios K, Sievers A, Wilshire E, and Ross B. **DNA restriction fragment analysis to define an extended cluster of tuberculosis in homeless men and their associates.** Jl of Infect Dis, 167(2):490-4, Feb 1993.

A cluster of tuberculosis in men associated with shelters for the homeless on Melbourne, diagnosed between April 1984 and July 1991, was reviewed with respect to the genetic relatedness of the infecting strains. Relatedness was determined by examination of Southern blot analyses of restriction enzyme-digested genomic DNA, using probes for repetitive sequences. From the initial 24 cases selected, isolates were available from 19, and 18 were identical. A total of 571 other Australian and Solomon Islands strains were examined for relatedness to these strains. Nine additional case strains were found to be identical; all were from recent Melbourne residents and at least seven were epidemiologically related to the original cluster. The identification of a single infecting strain of Mycobacterium tuberculosis in these 27 cases suggests that reactivation disease in this group may not be as important as infection or reinfection from another case.

Homeless advocates sue state for failure to control TB. Infect Control Hosp Epidemiol, 14(8):501, Aug 1993.

Mahan N, Jones M, McGovern T, Shapiro L, Shupert V, Elovich R, Robinson C, Isbell M, Jacobs S, Williams B. **The non-compliant health care system: Developing a system for TB prevention and care in NYC.** International Conference on AIDS 9:123 (abstract no. WS-D20-6), 1993.

ISSUE: The burden of the recent resurgence of TB in New York City has fallen overwhelmingly on populations that have been tragically underserved by the city health care system, namely people of color, homeless people, addicts and alcoholics, prisoners and parolees, and others living in poverty. Members of these groups who are living with HIV/AIDS face a particularly serious threat in the worsening TB epidemic, yet the city has failed to provide them with adequate protection or services. OBJECTIVES AND METHODS: Identify barriers to TB diagnosis and treatment for disenfranchised people living with HIV in New York City, and detail a TB control strategy that can protect all New Yorkers without the need to resort to inhumane institutionalization or illegal restrictions of liberty. RESULTS: The city's "system" for TB prevention and treatment is under-funded, difficult to access, and marked by gaps in services. Many HIV+ people living in poverty face unnecessary risk of TB infection in unsafe hospitals, shelters and prisons. Those with TB are routinely discharged from hospitals without follow-up appointments, medications, chemical dependency diagnosis and treatment referrals, housing placements or other adequate planning for ongoing care. Out-patient TB testing and treatment is limited, overburdened and unable to integrate TB treatment with patients' ongoing HIV medical care. Limited pharmacy hours and gaps in Medicaid coverage and other benefits severely hamper the ability of TB patients to obtain necessary medications. CONCLUSIONS: While compliance with necessary medical care is ultimately a matter of personal responsibility if they are enabled to meet more urgent needs, such as food and permanent housing. Consequently, unless adequate, accessible systems of care are in place to make voluntary treatment compliance possible, it is premature, fiscally unsound, and inhumane to detain people in the chronic, non-infectious stage of TB disease. The urgent need

to successfully stem the tide of the TB epidemic demands and the removal of systemic barriers to patient compliance not the wide-scale detention of individual patients who are denied access to medical care.

Nettleman MD. **Use of BCG vaccine in shelters for the homeless. A decision analysis.** Chest, 103940; 1087-90, April 1993.

As a result of many interacting variables, including crowded shelters and limited access to health care, homeless persons are at high risk for tuberculosis. Using traditional approaches, control of tuberculosis in this population has been difficult. Decision analysis was used to investigate the cost-effectiveness of BCG (bacillus Calmette-Guerin) vaccination in persons attending homeless shelters. This vaccination was cost-effective over a wide range of assumptions. Using conservative assumptions, a vaccine that was at least 40% effective would result in a net cost savings. If the efficacy of the vaccine were 50%, $4,000 would be saved, 12 life-years gained, and 23 cases of active tuberculosis prevented for every 1,000 persons vaccinated. Further study of the BCG vaccine in homeless persons and other populations at risk is warranted.

Paul EA, Lebowitz SM, Moore RE, Hoven CW, Bennett BA, Chen A. **Nemesis revisited: tuberculosis infection in a New York City mens shelter.** Amer J of Publ Health, 83(12):1743-5, Dec 1993.

In November 1990, a screening was conducted to determine the point prevalence of TB infection in a volunteer sample of homeless men (n=161) living in a congregate shelter in NYC. Of those for whom we have results (n=134), 79% were positive forTB. The mean length of shelter stay was 31.8 months and was significantly associated with the TB infection rate. This suggests that crowded living conditions and the presence of stable resident pool in crowded congregate shelters may be associated with transmission of TB.

Salomon P, Veiga R, Gray J, Tommer M, Holloway J, Gaston M. **HIV infection, AIDS endemicity and other risk factors for tuberculosis among the homeless**. Int Conf AIDS, 9:736 (abstract no. PO-C21-3114), June 6-11, 1993.

BACKGROUND: In 1989, 109 centers receiving Stuart B. McKinney Act support for primary health care for homeless persons, increased their TB service activity by 200%. At this time 8.3% of program users were known to be HIV+. HIV infection, TB, and homelessness may be considered interdependent in the sense that the existence of any one of these conditions increases the likelihood of incurring the others. OBJECTIVE: To study the interrelationship of HIV and TB, on the provision of primary care for homeless persons, based on program data submitted by Health Care for the Homeless (HCH) providers, during CY 1990. METHOD: In 1990, a small subset of HCH primary care grantees accounted for approximately 90% of the TB related services reported. Data provided by these grantees was analyzed to explore a possible relationship of increased TB service activity with extent of known HIV seropositivity and or AIDS among the homeless persons served, as well as AIDS case rates in the surrounding community. An analysis was also made of the relationship between the reported level of TB service activity for the homeless and local TB case rates. Grantees were further analyzed in relation to a variety of clinical and demographic factors that can contribute to increased prevalence of tuberculosis among the homeless. RESULTS: Information will be presented on co-location and co-occurrence of HIV and TB among the homeless, as well as the relationship of these conditions to substance abuse, temporary shelter conditions, and other factors.

Sumartojo E. **When tuberculosis treatment fails. A social behavioral account of patient adherence.** American Review of Respiratory Disease, 147(5):1311-20, 1993.

Several conclusions about measuring adherence can be drawn. Probably the best approach is to use multiple

measures, including some combination of urine essays, pill counts, and detailed patient interviews. Careful monitoring of patient behavior early in the regimen will help predict whether adherence is likely to be a problem. Microelectronic devices in pill boxes or bottle caps have been used for measuring adherence among patients with tuberculosis, but their effectiveness has not been established. The use of these devices may be particularly troublesome for some groups such as the elderly, or precluded for those whose lifestyles might interfere with their use such as the homeless or migrant farm workers. Carefully designed patient interviews should be tested to determine whether they could be used to predict adherence. Probably the best predictor of adherence is the patient's previous history of adherence. However, adherence is not a personality trait, but a task-specific behavior. For example, someone who misses many doses of antituberculosis medication may successfully use prescribes eye drops or follow dietary recommendations. Providers need to monitor adherence to antituberculosis medications early in treatment. Providers need to monitor adherence to antituberculosis medications early in treatment in order to anticipate future problems and to ask patients about specific adherence tasks. Ongoing monitoring is essential for patients taking medicine for active tuberculosis. These patients typically feel well after a few weeks and either may believe that the drugs are no longer necessary or may forget to take medication because there are no longer physical cues of illness. Demographic factors, though easy to measure, do not predict adherence well. Tending to be surrogates for other casual factors, they are not amenable to interventions for behavior change. Placing emphasis on demographic characteristics may lead to discriminatory practices. Patients with social support networks have been more adherent in some studies, and patients who believe in the seriousness of their problems with tuberculosis are more likely to be adherent. Additional research on adherence predictors is needed, but it should reflect the complexity of the problem. This research requires a theory-based approach, which has been essentially missing from studies on adherence and tuberculosis. Research also needs to target predictors for specific groups of patients. There is clear evidence of the effect on adherence of culturally influenced beliefs and attitudes about tuberculosis and its treatment. Cultural factors are associated with misinformation about the medical aspects of the disease and the stigmatization of persons with tuberculosis. Culturally sensitive, targeted information is needed, and some has been developed by local tuberculosis programs.

Undated

Centers for Disease Control and Prevention. **CDC TB information guide.** Centers for Disease Control and Prevention.

The Centers for Disease Control and Prevention (CDC) Division of Tuberculosis Elimination (DTBE) has developed a CD-ROM that includes many of the materials found on DTBE's Web site. The CD-ROM is a quick resource for those who do not have time to connect to the Internet or for those who have slow or intermittent access to the Internet. The sections of the CD-ROM are as follows: 1. Education materials: Health care provider and patient education and training materials. 2. Major TB guidelines: Guidelines from CDC's Morbidity and Mortality Weekly (MMWR) series and joint statements from CDC and the American Thoracic Society. 3. Morbidity and Mortality Weekly Reports: TB-related articles from CDC's MMWR series. MMWRs are sorted by subject and by publication year. 4. Surveillance reports: Tabular and graphic information about reported TB cases from 59 reporting areas. 5. Slide sets: Various slide sets developed as an accompaniment to select publications. 6. Ordering information: Information on how to order free materials from DTBE (authors).

New Jersey Medical School National Tuberculosis Center. **TB interviewing for contact investigation: A practical resource for health care workers.** New Jersey Medical School National Tuberculosis Center.

This is a set of two tools designed to assist the health care worker in conducting a TB interview. The set contains the TB Interview Outline, a detailed guide to the tasks and essential points to be covered during an interview, as well as the TB Interview Checklist, an abridged version of the outline, which lists prompts for the interviewer and can be used while interacting with patients (authors).

New Jersey Medical School National Tuberculosis Center. **Performance guidelines for contact investigation: The TB interview, a supervisor's guide for the development and assessment of interviewing skills.** New Jersey Medical School National Tuberculosis Center.

This guide lays the foundation for TB control supervisors to identify the areas of health care workers' strengths and weaknesses in TB interviewing. It provides interviewer evaluation instruments and guidelines for training and education based on these assessment results (authors).